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# CHINA IN THE TWENTY-FIRST CENTURY: IMPLICATIONS FOR OPEN SOURCE RESEARCH

*A Report Prepared under an Interagency Agreement*
*by the Federal Research Division,*
*Library of Congress*

*November 1996*

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## PREFACE

This study seeks to contribute to a better understanding of implications of information and communications trends for open source research on China to the year 2010, including likely information flows and controls in China. The combination of information sensitivities and strict controls over information and information gathering restrict the dissemination of ma4ttterials and will continue to limit the availability of information about China. The study discusses creative approaches to acquiring and analyzing material on China and includes a bibliography of the major sources consulted.

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## OVERVIEW

China's state-supported newspaper, *Guangming ribao* (Enlightenment Daily), declared in 1995 that:

> In a modern society, a country's access to effective information as well as its efficient development and utilization of information resources represents a major source of that country's competitive power, and also serves as an important foundation on which the country can cultivate comparative advantages during its economic exchanges with other countries.[1]
>
> The resource based on integration of information and telecommunications ... enjoys tremendous flexibility and can said to be exhaustible.[2]

If modern states are to maintain their competitive power in the geopolitical, societal, military, as well as economic, realms, they must exploit the available world of information. For the United States, continued access to open source information is vital. Open source information yields a complex array of material, which is gathered through a variety of means--through physical channels (for example, in hardcopy format such as publications) or through online sessions (bulletin boards, Internet, or intranet). Although much of the currently available open source information on China relates primarily to the business environment, the search strategies used to access that information can also be used as a model to access information on other areas.

China's economic reforms and opening to the outside world began in 1978 and have resulted in increasing demands for telecommunications services and an expansion of the nation's information environment. China's potential both as a telecommunications market and for developing its information sector are vast. Although conditions for developing domestic data telecommunications businesses are favorable, the leadership's approach to increased openness to information has been to regulate the sector. Beijing may wish to impose further controls in the mid-term future. However, it is unlikely that the ability or the will either to completely close or to successfully monitor the increasingly open information sector will be as thorough as some top leaders may wish. Further, the penalty for too severe restrictions on information may ultimately choke, then negate, the positive benefits of increased business opportunities, which provide much-needed foreign exchange.

Information is for sale. Reduced state funding, combined with the mandate to replace lost

revenues through entrepreneurial endeavors and the profit motive--spurred on by economic reforms--has abetted the rise of China's information industry. However, Chinese officials estimate that the information sector, "is some 20 years behind the average world level."[3]

## The Information Environment: Telecommunications Structure and Information Controls

### Telecommunications Structure

China has a variety of national communications networks and telecommunications service providers. The telecommunications environment is managed by various national and local government administrations. At the apex is the cabinet-level Ministry of Posts and Telecommunications (MPT), a State Council organization that sets telecommunications policy; issues plans, standards, and technical regulations; and oversees equipment approval and interprovincial network construction and operations. The MPT's plans are formulated in conjunction with the state's five-year plans--the latest being the Ninth Five-Year Plan (1996-2000). These plans are based on collaborations with the powerful State Planning Commission, the State Science and Technology Commission, and the State Economic Commission. The MPT also administers the public fixed telecommunications networks and related research and production facilities. These include government-owned corporations, such as the China National Corporation of Communication Construction and the China Posts and Telecommunications Industry Corporation. The MPT also administers various institutions, such as the Academy of Telecommunications Technologies and the People's Posts and Telecommunications Publishing House. In addition, the MPT serves as coordinator between the public and private networks and is involved in a wide spectrum of telephone, wire, telegraph, and international communications services.

The Directorate General of Telecommunications, an organization under the MPT, was established in 1993 to assume responsibilities for telecommunications network construction, operations, and maintenance. As of mid-1996, the transfer of all such functions to this subordinate directorate from the MPT was incomplete.[4]

The State Communications Investment Corporation, an organization with subministerial status, is responsible for infrastructure investment in the communications sector. The corporation

also has a Department of International Development and Cooperation.

Provincial level (provinces, autonomous regions, and independent municipalities) posts and telecommunications administrations throughout China have significant flexibility to plan and develop their own networks. Autonomy seems to vary depending on provincial-level finances; coastal provinces with greater incomes have more leeway than do the poorer interior provinces and autonomous regions (see Telecommunications Networks, below).[5]

**Information Controls**

A variety of organizations exercise control over the information environment, and Beijing continues to fine-tune information control responsibilities. At the highest level, the Propaganda Department of the Central Committee of the Communist Party of China (CCP) coordinates national-level control of information and is responsible for oversight of the Ministry of Radio, Cinema, and Television and the Ministry of Culture, both of which are subordinate to the State Council. Intermediate levels of control exist according to specialty. For example, the People's Liberation Army's (PLA) General Political Department supervises military publications as well as the output of the PLA's large Literary and Art Corps; the latter includes films, novels, poetry, and artwork. The Chinese Writers' Association is responsible for the content of journals published under its aegis. The All-China Federation of Literature and Art Circles, an umbrella group for nine organizations including the Chinese Writers' Association, is responsible for the output of its subordinate organizations.

In May 1996, the State Council Information Work Leading Group replaced the Joint Conference for National Economic Informatization. The conference, established by the State Council in 1993, is an ad hoc policymaking body for the information sector. The conference monitors the booming information industry and grants approval to Internet service providers, coordinates ministerial conflicts of interest (and those between the MPT and Unicom), and is establishing an electronic information market of economic and social information resources to integrate, expand, and facilitate information sharing among China's ministries and commissions. The new group is expected to function as an "industry supervisor and to oversee major projects" approved by the State Planning Commission.[6] Ministerial-level members of the working group

include participants from the State Council; the State Economic and Trade Commission; the State Planning Commission; the State Science and Technology Commission; the ministries of electronics industries, finance, and posts and telecommunications; and the People's Bank of China. The group has been directed to "... help provide solutions to the critical problems arising from large computer information networks and international networking."[7]

The most problematic issue for China's leadership is control. The CCP views liberalizing communications as a potential threat to its authority. Controls on information are not applied equally across the media and have always been imperfect, even in the Mao Zedong era (1949-76) when the party's legitimacy was usually unquestioned and punishments for disobedience were extremely severe. However, developments in the fast-changing information environment have limited the ability to manage and enforce restrictions (see Open Source Information: Restrictions or Liberalization; The Internet, below). The burgeoning information industry is subject to proliferating regulations and restrictions, but there is no question that control mechanisms are inadequate--and reactive--rather than planned.

## SCENARIOS FOR OPEN SOURCE INFORMATION (1997-2010)

### Market-Driven Availability of Information

The availability of information in China in the post-1978 reform period has been proliferating, and the information business is flourishing. Both internal and external sources of information on China are becoming more attainable than ever before. Substantial economic growth has led to a major expansion of the information industry and the need to improve and expand China's telecommunications base.

There is no question that avenues for exploiting open source information are expanding and that revenues for providing such information are increasing. Chinese officials estimate that business volume derived from online services will be valued at approximately US$120 million in 1996 and between US$360 million and US$480 million in 1997.[8] A conservative estimate; if this trend continues, is a business volume of nearly US$1 billion by 2000. Analysts need to note the likely correlation between the increased availability of information and decreased government funding and to be aware that when a government organization faces a state-budget shortfall it is

likely to join forces with a commercial enterprise to sell a product--information. Private-sector database services owned by state-run corporations and other public entities also sell information on a market basis. These circumstances likely will continue in the 1997 to 2010 period and US collection and analysis of open source information will be enhanced as a result.

Although foreign companies are prohibited from ownership in China's services sector and foreign involvement in the telecommunications sector is subject to limitations (for example, foreign companies are restricted from managing and operating public telephone services), financial gain is a motivator. As a result, government officials have ignored some foreign operations and have approved some cooperative "experiments" with foreign enterprises. These experiments are one way of trying to solve the conundrum in which the need to develop a more advanced technology so as to be able to offer an acceptable product or service--and become competitive (internationally)--is hindered by a lack of resources.

China's specialized open sources will become even more available and reliable. Non-official open-source channels have already provided a good deal of information on sensitive issues such as defense, corruption, leadership transition, and central-local relations. The only difference is that Beijing has not released this information officially. In the next fifteen years, it is believed that China will provide more official information on its nuclear policy, arms sales, military production, and political and economic corruption. This situation will have a positive impact on US collection and analytical efforts.

## Prospects for Continued Information Flow (or Otherwise)

China will remain open to the world as long as such openness does not endanger "state security," which includes economic, military and political security, and stability. *Stability* is included here because China's definition of security changes and is subject to varying interpretations across time. In terms of stability, China tolerates gradual fundamental economic and even political transformation, as has happened since the late 1970s. But China also will continue to contain dramatic policy shifts that might cause national or regional instability. All these systematic--and systemic--changes will influence the availability of information on China to foreign analysts.

Publications that test the limits of party and government control will face restrictions, especially during times of repression, which may be expected to occur periodically. In general, however, oblique criticism dispassionately presented by special-interest papers and journals is tolerated; explicit attacks on leaders and their policies is not. But, more and more, official efforts at censorship are being ignored while the media are moving away from self-censorship and are operating in a more free-wheeling environment. It is possible, but not likely, that a stricter post-Deng regime could alter this course of openness. For the most part, however, China will continue to move forward in making information available.

Links to modern communications systems are multiplying, first to provincial-level administrative divisions, and next to local levels. Provincial-level units are establishing their own Internet connections (see The Internet, below). The number of commercial and nonprofit firms in the information business both in China and in neighboring countries will multiply, including those providing Internet-based services. It is likely that an increasing number of firms in China will offer fee-for-service information or subscriptions. The expansion of online services and websites within China is only one indication of the growing availability of information about China.

In the near term, new media sources will proliferate and become more diverse in scope and value. A variety of competing publications already provide abstracts on a wide range of subjects (see Changes in the Open Source Information Setting, below). Many of these publications are aggressively marketed by their publishing bodies--think-tanks and quasi-government organizations such as the Chinese Academy of Sciences and the Chinese Academy of Social Sciences. For example, *China Astronautics and Missilery Abstracts* (CAMA), which has been published since 1994, sells full-text translations of many of its abstracted articles and papers. The number of journals electronically published on the Internet and providing full-text translations will also multiply (see Internet Publishing, below).

Although there is evidence of greater openness in information, some areas obviously will remain sensitive and subject to restrictions. For example, articles dealing with ballistic missiles, aerospace, nuclear-related topics, information warfare, and electronics abstracted in *CAMA* are not accessible to foreigners; neither is *Jiefangjun bao* (Liberation Army Daily). In some instances, sensitive information may not be released except for use in China or only to Chinese

users. The overall trend, however, is towards greater availability as evidenced by the increasing number of publications available both domestically and for export. Considerable amounts of gray literature are also usually available.

The number of potential open source "reporters"--individual or organizational, indigenous or foreign--is increasing. However, it is extremely difficult to quantify the rate of increase, other than to note a definite expansion in the overall media capacity--in a variety of formats--to generate open source information. This development likely will continue throughout the 2010 period. For example, China Central Television, the official television network, recently added a new program "Focused Interview," which exposes the "dark side of society," local politics, and economic activities. An officially sanctioned broadcast, the program has been well received, and certainly is an unusual fora for criticism of the government. Among the print media, the PLA began publication in early 1996 of a new paper, *Zhongguo guofang bao* (National Defense Daily), from which several articles have been translated by the Foreign Broadcast Information Service. The paper seems to be less rigid and more open-minded than *Jiefangjun bao* and is another indication of broader access to military information.

The July 1997 reversion of Hong Kong to China will likely result in continued--and increased--information flow through the 2010 period. Media expansion in a variety of formats--both from Hong Kong into China and from China into Hong Kong--will transpire. As discussed later in this paper, Hong Kong will remain an information hub although Chinese authorities will continue their more recent efforts to try to influence both the policy and content of materials vis-à-vis China (see Expanded Internal Information and External Flow of Information; New Avenues of Information and Expanded Publication Venues, and Public Media Outlets, Brokers, and Distributors, below). The free-wheeling Hong Kong environment will likely withstand restriction of the information arena from China's authorities although Beijing already has begun to position itself against divergent opinions--for example, by urging greater self-censorship. Nonetheless, existing conditions in Hong Kong portend that future prospects for continued information flow will not abate. The possibility exists, however, that a mass departure of Hong Kong residents--one opinion poll predicts an exodus of between 750,000 and 2 million people (out of an estimated population of around 5.5 million)--"if things go wrong" might allow for greater control by

Beijing.[9] In this scenario, Beijing presumably would be able to affect some limitations on open source access although given all other indications of increased access--even within China--this prospect would have limited success. The latter scenario, however, would likely negatively affect a growing--and continued information flow--at least in the near term.

## INVESTMENTS, TECHNOLOGIES, COMMERCIAL GROWTH, AND INFORMATION ACCESS

China's Ninth Five-Year Plan (1996-2000) targets the infrastructure. Specific goals are the speedy development of telecommunications and information networks and the acquisition of emerging high technologies and safe and reliable network operations in order to achieve a modernized, national information infrastructure--that is, to create an "information superhighway." An average annual growth rate of 20 percent for modernizing the information industry has been set for the plan years; the MPT will invest US$60 billion in the telecommunications infrastructure during that period.[10] Although the doubling of targets during the Ninth Five-Year Plan will help China achieve modernization, it will not be enough.

The development of China's telecommunications services requires a flexible and forward thinking strategy and increased capacity to meet demands. Wu Jichuan, minister of posts and telecommunications, noted in July 1995 that "Some departments may establish their own networks with approval."[11] Infrastructure development will be accomplished through the combination of extending the basic network (what is already in place) and "constant business expansion." Accelerated infrastructure construction, however, will have to be accompanied by

> . . . put[ting] forward the strategic task of promoting the informatization for the entire national economy.... populariz[ing] the use of telecommunication and information technology and establish[ing] all kinds of special-purpose information system [sic] in the main business operations and macro-economic control agencies.[12]

Although China is making great strides as it attempts to overcome infrastructure obstacles in order to address both its present needs and future technologies, improvements will not be easily attained. Even as China makes impressive gains in accomplishing modernization, however, it faces several fundamental obstacles. First, infrastructure is lacking and obsolete (improvements in areas such as power transmission and highways also are targeted). Second, funding remains

problematic. Third, technology advances rapidly.

Beijing's approach to modernization has been both to take intermediary steps and to import "leapfrogging" technologies so as to catapult into the era of modern technology. Leapfrogging has its advantages. It has allowed China to move from a situation characterized either by obsolete infrastructure or a complete lack of infrastructure to a more advanced, state-of-the-art situation in the 1990s--without having to expend the usual time necessary for the complete process. However, China's approach means that the improvements and capabilities have occurred without the benefit of a foundation of technical expertise. As a result, China lacks the knowledge base to manage new technologies and hence all new equipment and technologies must be accompanied by substantial training packages.

It is likely that business expansion also means combining government funding with commercial enterprises as well as devising "experiments" to circumvent restrictions on foreign involvement in the telecommunications and service sectors. In the telecommunications sector, foreign companies are limited to sales of equipment; ownership, management, and operations of telecommunications services and databanks by foreign enterprises are not allowed. And, as a condition of doing business, Beijing encourages foreign investors to establish joint ventures with domestic enterprises in the telecommunications sector. Similarly, the China National Posts and Telecommunications Industry Corporation, the country's primary telecommunications manufacturer, requires that foreign companies transfer their latest manufacturing technologies to joint ventures. Although foreign loans for importing telecommunications equipment were suspended in the early 1990s, the moratorium was "loosely interpreted" in 1994 and 1995, and relaxed in 1996.[13] Nonetheless, it is often difficult to secure financing for such ventures.[14] Unrestricted foreign involvement in the services sector is not permitted. It is understandable that without a legal basis for protection, some foreign firms are reluctant to conduct business in the telecommunications and service sectors although some firms do operate outside legally permissible boundaries.

Foreign business leaders are optimistic that as China increasingly recognizes that it lacks the resources and expertise to modernize the service and telecommunications sectors on its own, bureaucratic obstacles to investments in telecommunications will be modified or even made

obsolete. As of mid-1996, a telecommunications law had not yet been promulgated although drafting has been proceeding since 1986. Modifications--that is liberalization in the existing policy--will have positive ramifications on open source access.

For large foreign companies such as Motorola (United States), Alcatel (France), and Siemens (Germany) that already have established a substantial presence in China, business operations are somewhat easier. Smaller companies are more likely to need domestic partners to navigate successfully through China's bureaucracy.

Aside from funding and technology constraints, there are other hindrances to telecommunications development and information exchange in China. For example, information flow is impeded by the overall variation both in general literacy rates and in computer literacy within state enterprises and businesses. In addition, of the officially estimated 2.78 million business enterprises that use computers, only approximately 3 percent are believed networked (see The Internet and Illiteracy, below).[15]

**Improvements in Infrastructure and Technologies**

The Golden Projects, inaugurated in September 1994, is the foundation for China's national economic information modernization--the establishment of a National Public Economic Information Communications Network. The network's goals are to strengthen central macroeconomic policy, that is, regulation and control, by connecting the dedicated communication networks of all ministries and commissions under the State Council with provincial-level capitals, more than 5,000 cities throughout the country, and approximately 123,000 large- and medium-sized enterprises (including key state projects) and corporations. By December 1995, 24 provinces and municipalities (including Beijing, Guangzhou, Nanjing, Shanghai, Tianjin, and Wuhan) were interconnected to the network and were able to access integrated data on economic news, current stocks, bonds, equities, and commodities prices, fixed assets of foreign loan management, as well as connect to CERNET and CASNET (see The Internet, below). By the end of 1996, it is expected that 400 cities in China will be connected.

Jitong Telecommunications Co. Ltd., established in 1993, is authorized to provide value-added services to the Golden Projects through its VSAT network. Jitong is part of the Ministry

of Electronics Industry (which is responsible for the production of telecommunications components); its shareholders include approximately 25 large state enterprises--such as the China National Electronics Appliance Corporation, the Beijing and Nanjing wireless factories, and Shenzhen Guohua Trading Ltd.--as well as government organizations such as the Ministry of Radio, Cinema, and Television.[16] Jitong has contracted with the Joint Conference for National Economic Informatization to build the Golden Projects with China Unicom.

The projects' three initial components--Golden Bridge, Golden Customs, and Golden Card--will establish a satellite telecommunications trunk line network--China's information superhighway--and stations for computer networks and electronic post offices. By 2000, information telecommunication networks (including a satellite network and a fiber-optic network), computer systems (including software), and information resources (including database systems) are expected to be completed.

Golden Bridge capabilities include E-mail, access to online Chinese newspapers and serials, remote transmission of documents (FAX), and remote login.[17] Golden Bridge is linked to CERNET, CASNET, the State Information Center, and the information centers of the ministries of water resources and electronics industry as well as to the Internet in the United States and Japan.[18] Jiaotung University in Shanghai, the Shanghai Municipal Economic Information Center, and the East China University of Science and Technology are among the organizations with investments in Golden Bridge.

Golden Customs, or Golden Gate, an interconnected private network of foreign trade information, will link the information systems of foreign trade enterprises. Golden Customs is under the jurisdiction of the Ministry of Foreign Trade and Economic Cooperation (MOFTEC), which will use the network to exchange information between regional- and provincial-level departments concerned with foreign trade and economic cooperation, foreign trade organizations, related customs, taxation, shipping, banking, and insurance entities, as well as the Customs Office and Jitong. As of mid-1996, MOFTEC had communications links between regional facilities and provincial foreign-trade-and-cooperation bureaus and was able to collect trade statistics, refund taxes to export companies, monitor currency exchange rates, and administer quotas and licensing arrangements.[19]

The Golden Card project involves bank credit cards and electronic currency transfers. It will be piloted in coastal cities.

There are additional offshoots to the original Golden Projects in various stages of operations or development. These projects involve agricultural, educational, medical, commercial, and business management sectors. For example, Golden Tax targets improved information on tax collection and management.[20] Golden Macro-Control seeks to build a unified national database containing information on commodity prices, investments, natural resource capital, energy resources, and transportation.[21]

**Telecommunications Networks**

China's telecommunications system has public networks, satellite communications networks, wireless mobile networks, private/dedicated networks, Golden Project Networks, and intranet and Internet networks. Intranets, which are closed networks, are domestic computer networks under the jurisdiction of a variety of government organizations, extended by international linkage to the Internet (see The Internet, below). The MPT's public networks are interprovincial, intraprovincial, municipal, local, and rural. By 1997, the MPT plans to offer integrated digital network services in major commercial areas such as Beijing, Guangzhou, Shanghai, and Shenzhen. China's digital data network and its rapidly expanding VSAT networks provide increased access for computer networking.

In July 1994, the ministries of electronics industry, power industry, and railways (each of which has its own private telecommunications networks; the Ministry of Electronics Industry also has a significant telecommunications equipment manufacturing capability) jointly set up the China United Telecommunications Corporation (also known as China Unicom, Unicom, or Lian Tong) to break the MPT's monopoly and compete directly in the telecommunications business (see Investments, Technologies, Commercial Growth, and Information Access). A national conglomerate, and the MPT's sole licensed competitor, the corporation has shareholders from approximately 25 domestic companies, including the China International Trust and Investment Corporation (CITIC). Unicom is authorized to offer basic telecommunications services, and, with its fifty subsidiaries and cooperative links with more than 200 international companies, has built a

global system for mobile communications.

The communications networks of the various administrative divisions and state enterprises have different levels of capabilities. Xiamen, Fujian Province's largest industrial and port city and one of the five special economic zones, has attracted vast amounts of foreign investment. As a result, it has China's premier telecommunications network with digital exchanges, packet switching services, digital data services, and satellite communications. As of early 1996, Xiamen was the site of approximately 2,300 joint ventures worth about US$4.8 billion; Taiwanese and Hong Kong enterprises were the primary investors.

As of mid-1996, China's first experimental technological information network for science and technology information came online in Harbin in Heilongjiang Province. The network, set up by the State Science and Technology Commission, links government departments, research institutes, institutions of higher learning, and various enterprises across Heilongjiang by computer via the public data exchange network. The network provides access to more than twenty databases, including those with particulars on China's patents, enterprises, and science and technology achievements.

Wuhan, the capital of Hubei Province, is targeted for development as an international information hub by 2010. Wuhan's information industry project will focus on the technologies of network, multimedia, database, and satellite telecommunications. The project will computerize finance and commerce and construct integrated information networks in residential areas.

The Shenzhen Special Economic Zone in Guangdong Province began construction of its international information city in December 1995. Regarded as the hub for the zone's information superhighway, this rapid transmission network for public information will function as a consultation service center and information industry base by providing domestic and foreign information resources and collecting and distributing information within and without China.[22]

In early September 1996, Xinhua announced that China will install a computer network to link all of its military academy libraries to a central database connected to national and international computer networks. The database, with information on training and tactics, seeks to provide information that will improve modern warfare capabilities. The plan is to have the network in place by 2000. An unidentified military analyst doubted global access to the network

would be allowed as it would pose too great a security risk.[23]

ChinaNet, ChinaPAC, and ChinaDDN are part of the MPT's national backbone telecommunications system; subscribers to the latter two include government ministries, large banks, securities exchanges, public security organizations, and universities. ChinaPac, the national packet-switched data exchange network, began operations in 1993. By the end of 1996, ChinaPac is expected to reach more than 3,600 cities and have 140,000 ports; by the end of the Ninth Five-Year Plan in 2000, it will have 200,000 ports.

ChinaDDN, the national public digital data network, was inaugurated in 1994 and extended to more than 1,000 cities in 1995. ChinaDDN is expected to triple the number of cities and reach 140,000 ports by 1996 and to serve 300,000 ports by 2000. ChinaDDN is an overlay network that integrates other data services.

China also has a wide variety of private/dedicated networks. These include networks of the ministries of railways, electric power, electronics industries, finance, foreign trade and economic cooperation, internal trade, and transportation (links to its provincial and city transportation administrations and key enterprises); the PLA; the State Information Center; meteorology and seismology institutions; central television system; petroleum industry (linking major oil fields, petroleum refineries, oil product manufacturers, and research and development and academic institutions); civil air services (linking more than 170 cities in China and about 60 cities overseas); Customs Bureau; Xinhua; the China National Financial Network (a satellite communications network linking specialized, commercial, and policy banks); and the China National Space Industry Corporation.[24]

The PLA, with its tremendous control over radio spectrum allocation, is another telecommunications service provider. The PLA offers commercial cellular services.[25]

**Impact on Advanced Industrial and Telecommunications Technologies**

Improvements in telecommunications technologies will result in enhanced capabilities in internal and external communications. In turn, this will translate into a greater need for services and equipment--for the latter, both hardware and software. The development of servers, engineering work stations, microcomputers, industrial-control computers, personal computers,

financial use computer equipment, ATM systems, office equipment, peripheral equipment, applied software, and integrated circuits will have ramifications throughout China. With increasing Internet connectivity and usage, service providers and manufacturers of associated products are also targeting increased productivity--and profit--and planning further investments and improvements.

China has implemented several measures that have had an impact in the telecommunications sector. In June 1996, the MPT decreased charges for international telecommunications services an average of 20 percent; increases in postal fees by 30 percent are being considered.[26] The Beijing Long-Distance Telephone Bureau launched IDSN, a new telecommunications service, in July 1996. The service, offered via the Beijing International Telecommunications Bureau, may make visual image and data transmissions possible between Beijing and Japan, Hong Kong, Singapore, the United States, Germany, France, and the United Kingdom.[27]

**Expanded Internal Information and External Flow of Information**

Control of and restrictions on providing certain types of information may tighten, but these limitations will not preclude its continuation. It is likely, however, that users costs of some specialized data will increase. For example, access to China News Service World Wide Web Site is both free and fee-based. Current news can be accessed by paid subscription; free service is limited to news items of one week past. This same arrangement also applies, in various forms, to other electronic databases.

Dozens of China-related information sources can be accessed through the Internet (see The Internet, below). For example, *Renmin ribao* (People's Daily), *China Daily*, *Shenzhen Newsnet*, and *Hong Kong Standard* have Internet addresses; Tiandao or Twin Bridge software is needed to access Chinese-language services (see Appendix).

After Hong Kong reverts to China on July 1, 1997, it will remain both a regional telecommunications and information center and an international information hub. The exchange of information between Hong Kong and the rest of China will increase, and it may become somewhat easier to obtain information about China in Hong Kong although China has begun to

make pronouncements about the Hong Kong media, for example, that might indicate otherwise.

**Investment and Business Information Databases**

The expansion of China's business information databases--in support of the investment community--is but one example of the opening of China. These databases provide information on investment and business opportunities as well as products and services. Some databases will likely continue to be offered only in the Chinese language, but the expansion of English-language databases is inevitable. Although business information databases began to proliferate prior to the January 1996 restrictions imposed on the use of economic intelligence by foreign financial agencies, they clearly target cost recovery and profit. The benefits of providing such information no doubt will be weighed against the perceived risk of increased openness.

- The China Investment Guide Information System database provides information on economic plans, foreign investment regulations, laws, contract procedures, and the special economic zones. An IBM-compatible database for sale, initially available only in Chinese, this system is the product of a partnership between the State Information Center Technical Development Division and the China International Engineering Consultancy Corporation.

- The Macro Economic Application System provides macroeconomic data beginning in 1949 in a statistical format. Updated every three months with information from monthly and annual reports compiled by the State Statistical Bureau, the system is IBM-compatible and can be used for forecasting or regression analysis. This database is also sold and produced by the State Information Center.

- The Geographic Information Inquiry System for Investment is a current, comprehensive database that aids investment analysis, market research, and business decisionmaking. The IBM-compatible system sells geographically oriented data--economic and social information from all provinces, municipalities, and autonomous regions--as well as from geographic regions such as western China and the Yangzi River delta. The system is produced by the State Statistical Bureau's Investment Department and the Beijing Qihui Electronics Company, the latter affiliated with Beijing University.

- The Database of Projects for Foreign Capital Absorption and Trade Invitation in China is a free service of the Investment Institute of the State Planning Commission, the Database and Program Management Bank Department of the State Information Center, and the Economy and Law Department of the China International Engineering Consulting Corporation. The database contains

information on more than 4,000 projects, which can be sorted and accessed by a single criterion or a combination of criteria according to region, industry, project type, or investment type. Companies wishing to showcase a joint venture project are sent a booklet listing business opportunities; if a joint venture is successful, a "matchmaking" fee is assessed.

- The Chinese Enterprises and Companies Database contains records on more than 80,000 Chinese companies (Chinese version) and more than 20,000 companies (English). Listings provide company name, address, financial status, products, technology licensing, and joint venture information. The database is updated annually; information is obtainable at a set price through the individual company or a group of companies. The database is also sold on floppy disk or CD-ROM.

- The Guangdong Foreign-Investment Enterprises Database sells information by sector on IBM-compatible disks, with cost depending on the extent of the data requested, or for an entire set of disks. The database, compiled by the Guangdong Research Institute of Foreign Economic and Trade Relations, has forty information categories for each of the 23,500 foreign-invested enterprises in Guangdong. It includes the name of the company in Chinese and English; the rest of the information is in Chinese only: address, legal status, products, and bank account numbers.

**Technical Information Databases**

The Technical Information System Promotion System of the Institute of Scientific and Technical Information of China (ISTIC) disseminates scientific and technical information. The Wanfang Data Corporation, a subsidiary of ISTIC, specializes in developing business information databases. One such database, the Chinese Appropriate Technology Achievements Database, is IBM-compatible and has information on more than 80,000 Chinese technological projects. Another IBM-compatible database, the Chinese Scientific Institutions Database, lists approximately 5,000 large- and medium-sized scientific and technological institutions, including academic and research organizations.

**Other Information Providers**

Another important electronic-access development is a project being carried out at the Shanghai Library. The official library of the municipality of Shanghai, the Shanghai Library serves as an information and research arm for the Shanghai Municipal Government and thus of the

Shanghai Municipal CCP Committee. The Shanghai Library, second in scope only to the National Library of China in Beijing, has the largest collection of Chinese-language periodicals in China and has been designated by the Ministry of Culture as the national repository for serial publications. In October 1995, the Shanghai Library was "integrated" with the Institute of Science and Technology Information of Shanghai and the library of the Shanghai Academy of Sciences (ISTIS). In 1996, the libraries moved into a new building, which reportedly is fully automated. A "Cy-brary" atmosphere is planned for the new building, with LANs, a multimedia network, World Wide Web, and ChinaNet and Internet links to other Shanghai and neighboring provincial libraries. The library also will be a center for high-speed information exchanges. With its reconfigured management mode, the Shanghai Library offers both traditional library services and science and "think-tank" services to the municipal government. A full On-line Public Access Catalog (OPAC) and CD-ROM versions of rare books are planned.[28]

Of most significant benefit to open-source research is the availability of a pc-based product being developed by the Shanghai Library's Professional Work Office in cooperation with the Wen Da Information Company, a database company owned by the Shanghai Library. Wen Da is developing a CD-ROM index, performs fee-based information retrieval services, and runs a bookstore. The CD-ROM index, which is funded by the Ministry of Culture, is derived from an electronic database that includes, as of October 1995, some 400,000 articles from nearly 4,200 Chinese current periodical titles. The project started in 1993 with 1993 publications and plans to continue with new publications and, as funds are available, to add retrospective records at least back to 1990. Wen Da hopes to add 200,000 items to the database annually. All articles from 130 key titles are indexed, and selected articles are indexed from 4,000+ other titles. This index can give open source researchers an unprecedented ease of access to the largest and most important body of Chinese-language serial publications in the world. Instead of issue-by-issue screening, open source analysts can search by subject, find their citations, and then obtain the full text of the article. Although translation or abstracting must still occur, the time-consuming work of screening the original publications is eliminated. Many but not all of the serials covered are in the Library of Congress.[29]

In May 1996, Sybase (China) Company and Sybase China Ltd., the Beijing Commodities

Exchange, the China Defense Information Center's Database Division, and Hechuang Data Communications Technology Co. agreed to implement an Internet-based Sybase database information system, China Internet Sybase Information System. Xingye International Network Center (PANNET) will provide online information services and be an Internet service provider for domestic commercial users. PANNET is an example of cooperation between business and industry; it is a joint venture between Beijing Acer Xingye Technology Development Co. and the Beijing MPT authorities. PANNET has an independent Internet node.[30] A National Population Research Institute Network database supplies demographic information.

The Beijing Information Infrastructure (BII) is being promoted as a key project for the twenty-first century by members of Beijing's Municipal People's Political Consultative Conference, who view the BII as a means to develop other high technology industries. Although Beijing lags behind China's other major cities in information resources and technology, in 1994 almost 44 percent of Beijing's total labor force worked in the information industry and almost 42 percent of the city's gross domestic product was derived from the information industry's output value.[31]

*Chinese Databank Collection*, a national survey of more than 1,000 Chinese databanks, was compiled in early 1996. The survey seeks to position the information industry for the future.

## Domestic Investments

China has sought both to control foreign involvement in its telecommunications and services sector and to expand domestic participation. To this end, Beijing has tried to foster the internal investment environment. The State Development Bank is responsible for funding priority infrastructure projects by using existing state investment corporations to provide a steady source of low-interest loans to state-owned enterprises to ensure tighter control of capital investment. The bank was founded in April 1994 by merging six investment corporations under the State Planning Commission.

The Great China Telecommunication Co., established by the merger of eight state-owned companies, seeks to counteract foreign domination of China's telecommunications market. The central government will provide sales credits and research and development grants so as to enable

the company to succeed. In exchange for the money, the company must ensure that at least 20 percent of the program-controlled digital-exchange systems sold domestically are Chinese.

## Foreign Investments

China's opening since the 1978 economic reforms has resulted in unprecedented business opportunities for foreign investments and joint ventures. Because economic modernization cannot be achieved without an advanced telecommunications infrastructure, the government has targeted the postal and telecommunications sector for massive investment and development, providing them with preferential treatment. As a result, capital investment increased at an average annual rate of 75 percent in the 1990-95 period. In a bid to further encourage infrastructure investments and increase the investment growth rate, in June 1996 China announced 210 key projects in communications and infrastructure that were open to foreign investors. Preferential tax exemption policies for these projects were established, although localities may draft additional preferential policies.[32] However, Beijing expects that 1996 regulations on monetary policy and foreign debt will reduce capital investment in 1996 from US$12 billion to US$11 billion.

### The West

The market for telecommunications products and services is vast--as befitting China's geography and population. Numerous sales contracts have been signed for equipment purchases, particularly for mobile telephones. (As of mid-1996, China Unicom had 50,000 cellular phone subscribers and was operating in Beijing, Guangzhou, Shanghai, and Tianjin; by the end of the year, the network will expand to a total of 48 cities with a capacity of 1 million lines.)

Besides an abundance of sales agreements, there have been many joint ventures. In April 1996, Motorola of the United States signed a joint venture agreement with China's State Intelligence Computer Research and Development Center to establish the Joint Telecommunications Technology Laboratory, the first Sino-foreign research institute. The center will focus on the development of high-performance telecommunications products for the domestic and international market. The partners will split the intellectual property rights on a 50:50 basis.[33]

Alcatel and the Beijing Telecommunications Administration signed an agreement in 1995

to build an experimental ATM network for providing audiovisual, multimedia, and high speed data transmission services for enterprises, institutions of higher learning, and research institutes. (The Beijing Telecommunications Administration is China's first Internet service provider.)

**Japan**

Through overseas Chinese and Hong Kong investors, Japan is the largest capital contributor of capital to China, primarily in the form of loans rather than investments. Japan's Overseas Economic Cooperation Fund has loaned a total of US$16.8 billion to China for 11 projects aimed at accelerating economic growth by removing impediments to economic growth and supporting sustainable development. The 30-year low-interest loans have a 10-year grace period. One such project will enable the State Economic Information System Project to acquire computers and consulting services so as to develop and install seven economic information systems to collect, supply, and analyze economic data to assist in planning and operating the macro economy.

**Taiwan**

Since 1993, Taiwan has been the third-largest investor in China--overtaking the US position. Taiwan's capital is in the form of direct investment or projects, not loans.

## CHANGES IN THE OPEN SOURCE INFORMATION SETTING

### New Avenues of Information and Expanded Publication Venues

New avenues of information from and about China have developed both from the increased number of modes and from the increased output from these modes. Satellite communications dishes and Internet connection are the most advanced information vehicles. As of 1995, China issued 2,000 newspapers and more than 8,000 periodicals, and had 560 publishers. Approximately 59,000 new titles were published in 1995. The number of printing factories had increased to more than 5,000, 10 times more than that in 1978.[34] For the output of publications, see the attached tables.

The world has entered a phase of technological sophistication in which it is widely

believed that governments can no longer monopolize and control information. In other words, technology is assumed to have facilitated decentralization and led the demise of governmental control. Indeed, with today's unequalled volume of transborder information flow, challenges to the control of information dissemination are rapidly emerging. Nowhere are these complexities perhaps more apparent than amid the economic reforms and opening policies currently underway in China.

China's mass communication system is designed to enforce uniformity. In both structure and philosophy, the system is centralized and hierarchical.[35] Ideologically, the mass media is viewed by the CCP as a tool for propagating socialist ideals and executing party policies; the news media therefore cannot engage in open debates about these issues.[36] News outlets are expected merely to promote official policies and not to cater to consumer needs.

Traditionally, the party has functioned as the owner and manager in all media realms, each of which are staffed by local party members. Each administrative level of the media is supervised by a party unit, and all authors, editors, journalists, or other writers typically have been salaried employees of the state.[37] Additionally, in certain cities, newswork meetings are regularly held between newspaper editors and CCP leaders, further illustrating the close tie between politics and the media.[38]

The sale of paper and printing presses has also traditionally been controlled by the state, and publishing houses, which have operated under state subsidies since the CCP assumed power in 1949, have been of necessity more concerned with producing books that reflect "correct thought" than books that might interest the consumer.[39] According to China's "three-tiered inspection" system, manuscripts or articles have customarily been reviewed by three party members--an editor, a managing editor, and, finally, the editor-in-chief--before being approved for production, thereby preventing the publication of any controversial works.[40] This rigorous method of inspection also demonstrates the party's strong commitment to the centralization of information.

When China opened itself to foreign investment and implemented a market-oriented economy under Deng Xiaoping in 1978, the publishing industry was faced with many challenges. The new emphasis on economic development initially compelled leaders to allow the import of

foreign publications containing information on economics and technology. Gradually foreign publications relating to other areas also were allowed into the country.

The entrance of foreign electronic publications in the 1980s introduced many English-language journals in CD-ROM format. Although the majority of these publications contained business or technological topics, reference books and foreign-language dictionaries have also appeared. As the influx of these materials has increased, it has become more common for official approval to be weighed according to the scientific value of a work, rather than its ideological content.[41]

Affected by these economic and social changes, media outlets increased in variety and number, which facilitated competition in the publications industry.[42] The rising popularity of foreign economic and scientific periodicals, for example, inevitably required that state-subsidized publications make certain content changes in order to maintain an audience's attention.

Among the first measures of this kind were the appearance of shorter, more lively articles in *Renmin ribao*, the official publication of the CCP. Thirty new categories of coverage were also introduced into the foray of official news, a vast change from the narrowly focused, highly politicized writing on revolutionary themes that had become common in previous years.[43] In order to accommodate the expanded coverage of news and economic activities, *Renmin ribao* also increased its size from six pages to eight.

Many other Chinese newspapers have also expanded coverage to include entertainment, sports, humor, and gossip sections.[44] This new material contributes to widening the gap between political censorship and free expression in the media. It also provides new sources of information on Chinese society.

The state-subsidized publishing industry was also similarly compelled to succumb to market forces. As the futility of attempting to maintain market share solely through the production of works deemed politically correct became ever more apparent, state-owned publishing houses rapidly turned to sideline production of mass market books and periodicals that were distinctively apolitical.[45] In the 1990s, these works have included an array of subjects ranging from pornography to the unauthorized biographies of various officials. The government continues to officially ban such works, but this effort often serves cross-purposes by arousing the

curiosity of the consumer, and thus boosting sales.

The profit-making potential of these works also initiated the establishment of a multitude of underground publishers; in the past, all publishing had been done by registered, state-owned companies. These pirate publishers have tremendously complicated control problems for the government. In many cases, officially banished books have been reproduced illicitly, subsequently reemerging with a much higher value on the black market. Although all books and periodicals in China are required by law to bear the registration numbers of their publisher, underground printers sometimes simply forge the names and identification numbers of state-owned companies onto illegal press runs, making it nearly impossible for government inspectors to trace them.[46] The profits these works produce often make the risk worthwhile.

In addition to condemning these profit-seeking publications, in 1994 the party decided to continue subsidizing only two national newspapers, *Renmin ribao* and *Jingji ribao* (Economic Daily). Perhaps in taking this step the party leadership assumed that without financial support from the state, maverick publishers could not survive. On the contrary, however, reductions in state subsidies have led to the advent of advertising as an alternative means of financial support. The greater economic independence this affords the media also enables publishers to make decisions about content that are autonomous from those the government has systematically outlined.

There are several new-style and very entrepreneurial vendors of publications in China. In the past, US government agencies, academic libraries, and other institutions requiring large numbers of publications from China normally obtained them through government agencies, the China International Book Trading Corporation, or the China National Publications Import and Export Corporation. Economic reforms and opening policies facilitated the establishment of government-owned book trading corporations whose managers were given complete responsibility for their operations. One such organization is the China National Publishing Industry Trading Corporation (CNPITC), which is owned by the State Press and Publication Administration. CNPITC operates strictly as a business venture, working on the profit motive to provide a full range of publications, including selected gray literature, to foreign purchasers. Other such organizations are Guoji Shudian (National Bookstore) and the China National Book

Export Trading Corporation. In 1995 China had a total of 32 book export companies, which usually deal through CNPITC and Guoji Shudian. Access to electronic publications was not expected to be a significant offering by CNPITC, at least as indicated by top company officials in 1995.[47]

The publishing sector also has expanded its overseas cooperation. The Fujian Provincial Publishing Corporation, founded in 1951, owns seven publishing subsidiaries, two bookstore chains, two printing factories, and six circulation service companies. The corporation has concluded cooperation agreements with publishing houses in Hong Kong, Macau, and Taiwan, and its representatives have visited book publishers and distributors in countries such as Germany, North Korea, Singapore, and the United States.[48]

Some problematic consequences have appeared in the news sector as a result of advertising, however. Industries eager to promote their products reportedly have paid media representatives to write stories about them, rather than wait several months to have their products advertised commercially at more expensive rates.[49] Although the ethics of these arrangements are questionable, it reflects the fact that many publications currently in production in China are being driven more by economic and social factors than by political forces, as had been the case in the past. As state-subsidized publications are increasingly forced to rely on market demand, it can be expected that subject-matter will continue to evolve and expand.

Another large source of revenue in the media sector in recent years has been investment from international industries, particularly those based in Hong Kong and Taiwan. One of Hong Kong's media conglomerates, CIM, has attempted to capitalize on China's opening market by expanding its entertainment bases into the mainland. To this end, CIM has established joint venture publishing contracts for Chinese magazines, in addition to purchasing the publication rights for particular books and the distribution rights of several newspapers. In order to avoid the potential consequences of censorship, CIM strategically implemented its own oversight committee to monitor the direction of these publications.[50] This committee is chaired by an appointee from China, a compromise which might be expected to avert political problems for the industry.

The entrance of international investment into the publishing sector has also provided a window of opportunity for individuals to benefit from fees earned as private consultants or

freelancers. For example, many writers formerly employed by the state have sought independent financial means of publishing works with wide appeal on the mass market. Because private sponsorship of individuals enables publishers to forego the "three-tiered inspection" required by the state-distribution system, the consulting industry is a particularly challenging arena to monitor. It is the existence of corporations such as CIM that has facilitated consulting as an option.

If international industry continues to expand into the media sector, it will create additional pressures for the state-subsidized publications trying to stay in business amid growing market competition. As these publications are increasingly affected by the forces of capitalism, it can be expected that their content will also be required to evolve and expand. In short, as economic reforms and opening begin to have an impact in the publishing industry, the parameters for the media are becoming wider. This is not to suggest that the bounds of the press have become limitless, however.

As Chinese political dissident Liu Binyan observes, although the past decades of reforms have included an unprecedented period of law-making, laws protecting freedom of speech are still severely lacking.[51] In fact, the Criminal Law enacted in 1979 and amended during the 1980s contains many provisions for punishing any speech deemed officially incorrect. Counterrevolutionary speech, insular and slander offenses, false accusation, and false witness are all types of speech that can be penalized by the government. These provisions have been used in lawsuits by officials against journalists who criticize or reveal the criminal behavior of party members.[52]

Even in 1996, the CCP Central Committee Leading Group for Ideology continues to direct departments responsible for newspapers and periodicals to continue scrutinizing items considered ideologically questionable. Several influential periodicals have been closed down by authorities for allegedly printing articles containing what were described as "serious political mistakes."[53] It is apparent that, although the incentive has emerged to print anything that will sell, publications still must operate within certain parameters.

Another channel through which the government has been able to impose controls on information opened up with the enactment of intellectual property laws. These regulations were initially implemented to abate the growing international pressures that were developing as a result

of the huge financial losses that foreign investors were suffering as a result of the widespread piracy of copyrighted works. Such items have typically included films, compact discs, and publications. Although numerous raids on pirating factories have occurred in China in recent years, there is evidence to suggest that they are not always undertaken solely in the interest of adherence to international standards for intellectual property rights protection. In fact, in the United States/China Intellectual Property Rights Agreement, signed in 1995, China commits to enforcing intellectual property while also pledging to adopt measures necessary to protect "public morals."[54]

In 1996 alone, the Xinhua News Agency reported the confiscation of thousands of books that were said to contain obscene or reactionary content. Because these works were pirated, the move could easily be lauded both domestically and internationally as being in compliance with China's efforts to maintain intellectual property rights standards. Speculation about the potential consequences of such action on the development of free press would undermine this praise, however.

The CCP has frequently suggested that the purpose of the current economic reforms is to strengthen the party's leadership and supervision.[55] The continued governmental control of information flow in China, even amid an unprecedented economic growth, emphasize the inherent complexities of this goal. While the publishing industry becomes increasingly autonomous financially and hence market-driven, it concurrently becomes more difficult to monitor. Nonetheless, China's leadership is clearly demonstrating an interest in preventing the erosion of its power base by finding alternative means of regulating the information influx. The media are thus faced with the dual challenge of satisfying the market and the party.

Although it is impossible to accurately predict the future course of China's publishing industry, the economic impact of integrating Hong Kong with the mainland in 1997 is certain to be significant. Major shifts in the free-wheeling Hong Kong press in anticipation of China's takeover are already evident as a result of regulations laid down by Beijing saying that Hong Kong publications must support reunification.

Because of the abundance of advertising revenue in Hong Kong, a media industry has developed there that serves as one of the world's major regional centers for entertainment.

Publishing is thriving. Because the British-controlled government rarely practices overt censorship and there are no restrictions on who may apply for a license to start a publication, variety is abundant. Additionally, because no political parties were allowed to exist in Hong Kong before 1990, much of the media has developed without a distinctive political orientation. The integration of Hong Kong's media realm into China could therefore facilitate opportunities for expansion in the mainland. As journalists prepare for China's takeover, however, content and style changes are becoming prevalent.

It is commonly assumed that China keeps dossiers on journalists, and threats made from the mainland to the Hong Kong press, in combination with previous singling out of certain reporters for printing articles unfriendly to China, have led to a feeling of apprehension among publishers and journalists.[56] Many publishers eager to enter China's market or avoid political difficulties after 1997 have thus begun to practice self-censorship, in which certain information is diluted or omitted in order to avert potential adverse consequences for themselves and their organizations. This trend, which has occurred since 1984, makes the adoption of centralized regulatory measures by the CCP largely unnecessary. Its continuation could hinder freedom of expression in Hong Kong over the long term.

The Hong Kong media has long been driven by market forces, and as the date for integration with the mainland rapidly approaches, investors are keeping a watchful eye on the political situation. As the support of the Hong Kong financial base is a necessary component of Hong Kong's continued smooth economic integration with China, the CCP's next moves will be crucial in shaping the future course of China's economy and, ultimately, the publishing industry.

**Internet and CD-ROM Publishing**

China's electronic publishing industry began in the mid-1980s with floppy discs. There are approximately 1,000 different such publications on floppy disks as of mid-1996.[57]

There is a small but rapidly growing body of digitized Chinese-language, social science material available on CD-ROM, diskette, and through online databases.[58] Online journals and newspapers can be found at multiple sites. The China Electronic Newspapers and Periodicals Online Service Center is China's first organization providing online Chinese newspapers and

periodicals. Electronic editions included in this service are *Guoji shangbao* (International Business News), *Jingji ribao* (Economic Daily), *Renmin ribao*, *Zhongguo maoyi bao* (China Trade News), and *Zhonghua Gongshang shibao* (Chinese Industry and Business News). A telephone dialer and E-mail capability allow foreign and domestic readers immediate access via the Internet.[59] (In fact, most Internet users access networks telephonically.)

There are almost three dozen Chinese-language magazines on the Internet (see Appendix). Some of these periodicals require their servers to have a Chinese viewing system. Many of the publications are produced by overseas Chinese students and scholars. These magazines include:

- *Xinyusi* (Chinese Net Magazine) published by netters on alt.chinese.text;
- *Daqian shijie* (Multiworld), a bimonthly multilingual publication distributed via the World Wide Web; and
- *Zhonghua pingshu* (China Commentary).

*China Infoworld*, with a circulation of almost 100,000, is one of China's largest publications on computer science and markets. As of July 1996, it is accessible on the Internet in English and Chinese editions.

Some Chinese-language newspapers or journals are available both online and on CD-ROM. These publications include *Zhongguo jisuanji shijie* (China Computer World), *Zhongguo xinxi shijie* (China Infoworld), and *Renmin ribao*. The official newspaper *Guangming ribao* (Enlightenment Daily) and *Yangcheng Wanbao*, a leading newspaper from Guangzhou, also are putting issues on CD-ROM.

The Shenzhen SAST Laser Information Company also has published legitimate CD-ROM titles, which run under Windows and include a basic text search and retrieval engine. Two of these publications are:

- *Encyclopedia of Laws and Regulations of China* compiled by the State Council's Bureau of Legislative Affairs; the disc comprises some of the material contained in Hong Kong University Faculty of Law's Law-on-Line (see below). [NOTE: The Legislative Affairs Commission of the Standing Committee of the National People's Congress, which sometimes clashes over drafting issues with the Bureau of Legislative Affairs, publishes its own competing CD-ROM through the State Information Center.]

- Database of laws and regulations of China;
- Database of laws and regulations governing foreign-related matters (Chinese-English);
- Database of explanations of justice of China;
- Database of judicial precedents in China;

- *Companies of China* data from the State Statistical Bureau on 400,000 companies in 45 categories (for example, petroleum refining, foodstuffs, textiles, etc.).

In 1995 the State Information Center (SIC) in Beijing estimated that there were more than 1,000 databases available from the SIC online, on CD-ROM, or on disk diskette, nearly all of them in Chinese. These include:

- CD-ROM, Fee-membership online (both in China and through Hong Kong University's Law-on-Line) and
- *State Laws and Regulations*, produced by the Legislative Affairs Commission of the NPC Standing's Committee. The 1995 cost was US$ 1,600 for CD-ROM version.

(For Chinese titles and contact information, see Appendix.)

Information on China is becoming more widely available on the Internet both through various newsgroups and listservs and through World Wide Web homepages. These homepages include:

- China page of Australia National University's World Wide Web Virtual Library http://coombs.anu.edu.au/WWWVLAsian/China.html). This site provides links to the archives of the China News Digest and Hanwen Xinzhai; to library catalogues in the mainland, Hong Kong, and Taiwan; to homepages in the mainland, Hong Kong, and Singapore; and to other China-related home pages around the world. A particularly useful addition to this site is the beginning of a rudimentary Chinese version of Uncover;
- Chinese Serials Data Base (URL:http://coombs.anu.edu.au/SpecialProj/AJC/CHIN/China-jrnls.html) is a cooperative project between the Australian National University Library and the National Library of China that provides an English and *pinyin* searchable database of tables of contents of selected Chinese serials as well as information about the

location of the journals. Most of the journals (see Appendix) cover economics, law, trade, and investment; and

- Asia-Pacific On-Line (URL: http://lawhk.hku.hk) a commercial service that markets the following products
    - Law-On-Line database services of the Law Faculty of the University of Hong Kong;
    - *China Laws and Regulations* (updated every 2-3 weeks by the Information Center of the Legislative Affairs Bureau of the State Council; in Chinese and English).

Includes

- National Law
    - Legislation from the National People's Congress and its Standing Committee
    - Circulars from the Supreme People's Court and Supreme People's Procuratorate
    - Selected Supreme Court Cases
    - National Administrative Regulations from the State Council and its Ministries
- Regional Law
    - Index of Legislation and Administrative Regulations of all provinces
- Special Collections
- Selected important laws relating to foreign investment, import/export.

**Public Media Outlets, Brokers, Distributors**

**China: Specific Journals as Sources of Information**

Of China's more than 2,000 officially registered newspapers, more than half were founded in the 1980s. There also are thousands of magazines that cater to a wide variety of special interests from martial arts to arts and crafts to military equipment. There are an increasing number of journals published in China (and in Hong Kong) that provide information of great importance on a variety of topics (see Appendix, Publishers and Distributors in China; Publishers and Distributors in Hong Kong). These journals may be classified as serious, or official

publications and are publicly available. The following are some representative journals:

- *Beijing Review* -- An official Chinese weekly of news and views, available in French, Spanish, Arabic, English, and numerous other languages since the 1950s. If read systematically over time, *Beijing Review* can offer useful information about China's social, economic, and political development. Information on economics and foreign relations is particularly reliable.

- *Bingqi zhishi* (Ordnance Knowledge) -- A monthly publication of the China Ordnance Society in Beijing, available in Chinese. This journal offers information on China's understanding of and knowledge about weaponry, especially weaponry from overseas. It also occasionally introduces China's weapons systems.

- *China's Foreign Trade* -- Published monthly in Beijing in Chinese, English, French, and Spanish since 1956. The journal provides rich information about China's foreign trade direction and structure. It highlights an economic sector or economic region.

- *China Today* (formerly *China Reconstructs*) -- Published monthly in Beijing by the China Welfare Institute in English, Spanish, French, Arabic, German, and Chinese. The journal contains articles on history, culture, customs, education, economy and social development, and includes beautiful color photographs.

- *Guoji wenti yanjiu* (International Studies) -- Published quarterly in Chinese by World Affairs Press and sponsored by China Institute of International Studies, an official institute in Beijing. This journal is highly recommended for those interested in China's foreign policy and Chinese perspectives on international affairs. Authors are mostly scholars with official affiliations.

- *Hangkong zhishi* (Aerospace Knowledge) -- A monthly magazine, published in Beijing by the Chinese Society of Aeronautics and Astronautics, available in Chinese. This periodical provides information on aerospace development history and current events, both in China and in foreign countries, but focuses more on introductory materials than on analysis.

- *Jianchuan zhishi* (Naval and Merchant Ships) -- A monthly publication published in Beijing by the China Ship Building Society; it is available in Chinese. The magazine focuses on the PLA and foreign warships, their development, capability, and equipment. The publication includes occasional discussions and analyses of foreign and Chinese naval forces.

- *Liaowang* (Outlook) -- A weekly Chinese-language publication from Beijing covering international news, domestic politics, and economics. Its editorials and analytical articles are valuable sources of information on official Chinese views of

ongoing issues.

- *People's Republic of China State Council Bulletin* -- Published only in Chinese about 30 time each year; it is issued by China's State Council. The Bulletin includes the most important official Chinese government documents, laws, and decrees.

- *Social Sciences in China* -- Published bimonthly in Beijing by the Chinese Academy of Social Sciences and also available in English. The articles are of high academic quality and concentrate on economics, philosophy, politics, religion, literature, linguistics, sociology, and history. The opinions offered are quite rigid and follow official political lines. The journal is a static, rather than dynamic, study of China's problems.

- *Zhanlue yu guanli* (Strategy and Management) -- A quarterly publication in both Chinese and English from Beijing; started in 1993. A semi-official journal, it addresses social, political, economic, cultural, and military issues. The publication is sponsored and supported by retired high-ranking officials, generals, and think-tank analysts. This publication plays an important role in China's think tanks, which also have a major role formulating current government policy.

- *Women of China* -- Published in Beijing monthly; available in English. This magazine carries articles on women in the arts, sports, and other social and political activities. It offers a positive and narrow view of Chinese and national minority women in history and today.

- *Xiandaihua* (Modernization) -- A monthly publication, sponsored by the China Science and Technology Association; available in Chinese. The journal provides a comparative perspective on Chinese and Western modernization, current events, science and technology, personnel, and commentaries. It reflects new social and philosophical changes in contemporary China.

- *Xiandai junshi* (Conmilit) -- A monthly publication by Contemporary Military Publishing House in Beijing, printed in Hong Kong. This journal, which focuses on the most advanced military development in China and foreign countries, analyzes weapons systems, technologies, military tactics, and strategies. By reading this journal carefully, readers will be able to sense how the Chinese assess their military power and development and how they plan to meet the challenges from stronger powers.

- *Zhongguo fangyu* (Chinese Territory) -- Published bimonthly and sponsored by the Institute of Chinese Administrative Divisions in Shanxi Province; available in Chinese. This magazine carries articles on administrative divisions and place

names in China.

- *Zhongguo junshi kexue* (Chinese Military Science) -- A quarterly publication of the PLA Military Academy since 1988. The contents of this journal include basic military theory, defense construction, military development, strategy and tactics, military technology, defense economics.

There are also several hundreds of *xuebao* (college/university journals), such as *Beijing daxue xuebao* (Beijing University Journal), *Nanjing daxue xuebao* (Nanjing University Journal), and *Zhongshan daxue xuebao* (Zhongshan University Journal). These journals are often of high academic quality; most are in Chinese.

These above-mentioned open publications have existed for years and will continue to be valuable sources. Although the Chinese government has routinely promulgated new regulations to control the nature and scope of these journals, China has gradually become more open and flexible as far as the content of these publications is concerned. The differences are easily noticed when one compares 1990s issues of *Beijing Review* with 1970s issues. The publication has kept its official style, but since the early 1980s issues have been more informative and interesting than were the former issues, which contained mostly propagandistic articles.

As China moves toward a market system, the economic situation causes benefit-driven publications to meet the new information demands of readers. If readers are able to get information from outside--that is, from foreign journals--then they will not subscribe to domestic Chinese publications and the latter publications will fail. Thus, publications in China must catch up with what the market demands and provide increasing amounts of information on more diverse subjects.

Whether or not the total number of journal publications will grow in future years is uncertain. Faced with rising costs and stiff competition, some publishers will have to withdraw their publications. In addition, because of a shortage of financial backing, it is difficult for new journals to emerge.

Nevertheless, in terms of the availability of open sources, the number of current journals published in China is overwhelming. Publications must first be translated, however. The Foreign Broadcast Information Service (FBIS) has been doing an excellent job of obtaining and

transferring information from Chinese into English. However, with FBIS downsizing and the plethora of Chinese-language sources available, a large number of translators or analysts capable of reading Chinese will continue to be needed in the future.

**Asia-Pacific Region: Journals**

In the Asia-Pacific region, Hong Kong has been and will continue to be the most important port for open source information. There are many Beijing-supported newspapers published in Hong Kong that are much more open and informative than the newspapers of the mainland. Among others, *Wenhui Bao* often carries important and timely policy information from Beijing that is not disseminated in the mainland. There are also dozens of publishers, distributors, and brokers in Hong Kong (see attached lists), that will very likely continue after Hong Kong reverts to the People's Republic on July 1, 1997.

One institute in Hong Kong serves as a case study.[60] The Hong Kong Social Sciences Services Center publishes *Chinese Social Sciences Quarterly* and *China Book Review*. The two publications carry high quality articles contributed by outstanding scholars in China and overseas, covering subjects from history, culture, society, politics, to economics. Recently, its affiliated Hong Kong Institute of International Relations, previously named the Hong Kong Institute of China and the World, was established. In 1996, the institute began publishing a semmiannual academic journal, *China and the World*, that focuses on international relations and comparative politics. There institute has about ten researchers. The chairperson for these activities is Xu Zerong; all publications and staff living expenses are self-funded through private businesses, churches, and individuals. Xu, a doctoral candidate at Oxford University, is in charge of fund-raising and management of all research activities.

It is worth noting that the staff, and editors of the center and institute publications are open-minded liberals, but maintain close ties to mainland China. Such people have found that Hong Kong provides a free atmosphere for their publishing work. Beijing regards these intellectuals as "liberals," but not necessarily subversive and therefore tolerable. This toleration may be an example of the compromise that both liberal intellectuals and the central government have been searching for. If the compromise continues after 1997, institutions and publications,

such as those now in Hong Kong, will continue to serve as a bridge for the information flow between China and the outside.

A similar scenario also applies to Taiwan. Since 1987, the mainland and Taiwan have increased exchange activities of all kinds. Publications on China have mushroomed and will continue to increase. Among these publications are *Zhongyang ribao* (Central Daily News), *Lianhe bao* (United Daily News), and *China Times*. Reports on mainland China in these newspapers constitute at least half of their total news coverage. Taiwan also is a good source for pirated information from *neibu* publications on the mainland. As with mainland publications, the bias of Taiwan publications must be taken into consideration.

**Western Sources**

The following are China-related publishers, distributors, and wholesalers in the United States:

- Cheng and Tsui Co., 25 West St., Boston, MA 02111 (617) 426-6074.
- China Books and Periodicals, Inc., 2929 24th St., San Francisco, CA 94110 (415) 282- 2994.
- China Publishing Co., P.O. Box 342, Seal Beach, CA 90740
- China Research, 1500 NW 103rd Ln, Coral Springs, FL 33071 (305) 752-6274.
- China West Books, 160 Belhaven Ave., Suite B, Daly City, CA 94015 (415) 755-3715.
- Chinese Literature Press, distributed by China Books and Periodicals, Inc.
- China National Publications Imports & Exports Corporation (Beijing Book Co. Inc., 701 East Linden Ave, Linden NJ 07036.

In response to increased economic and cultural exchanges, China will likely set up more outlets or distributors in the United States. The number of bookstores or distributors, however, does not necessarily reflect the amount of information that flows from China. China may consider

it more efficient to open additional bookstores and distributors in Hong Kong or simply in the major cities of China because of financial limitations. Thus, publishers and distributors in China may be the main access point for our information search.

## Radio and Television

### Radio

Radio was the party's natural socialization vehicle in the earliest days of the People's Republic. It is comparatively inexpensive, its audience does not require literacy, and broadcasts can be easily modified to local dialects and minority group languages. According to government statistics, wire broadcasts reach 95 percent of the population and more than one in 10 citizens have radios of their own.

The Central People's Broadcasting Station (CPBS) controls China's national radio network; stations are under the supervision of each local area's Bureau of Radio, Cinema and Television. CPBS supplies programs to the entire country; provincial and local stations supplement the central news with local reports. CPBS also broadcasts programs for minority groups in the Korean, Mongolian, Tibetan, Uygur, and Kazak languages, as well as programs directed toward Taiwan and overseas Chinese listeners. Programs include much of the same fare as television: general news and cultural and educational programs, weather, sports, music, language lessons, and other didactic programs. Radio Beijing broadcasts to the world in 38 foreign languages, various dialects and subdialects, including Mandarin (*putonghua*), Amoy (*Xiamen Hua*), Yue (Cantonese or *Yue*), and Hakka (*Kejia*). English-language news programs are aimed at foreign residents in China and other countries. Medium-wave, shortwave, and FM stations reach 80 percent of the country. Some 240 radio programs are broadcast on more than 500 radio, relay, and transmission stations.[61]

In the early 1990s, radio tried to regain the influence it had lost to television by adding call-in shows, a relatively new, nonofficial source of information. These shows began to be broadcast in major cities in 1992-93 and are especially popular on local radio stations, which, along with television stations, became more numerous during the reform period.[62] Call-in shows are favored fora for topics ranging from daily life to legal affairs to consumer complaints. This

innovation has changed radio performances from "we speak, you listen" to "you speak, we listen." A news director has pointed out that it is easier for radio stations than newspapers to avoid censors:

> If a reporter at *Wenhui bao* or *Jiefangjun bao* wants to write a critical article about a company, then first he has to show it to the company. Then the company will get to work and soon the critical article will be turned into a tribute. We're on the air before they can stop us.

Monitoring radio broadcasts offers insight on what China listens to--whether or not the programs contain officially sanctioned material. Of particular interest, however, is information that can be gleaned from broadcasts that are outside official programming. Given continued openness, it is likely that the latter category of programming, will continue to provide open source information on a variety of topical matters through 2010.

**Television**

China has the world's largest television audience. Television largely supplanted radio in the late 1980s because of its visual appeal, novelty, and greater availability. According the Ministry of Radio, Cinema, and Television, China had approximately 5 million television sets in 1979 and 250 million sets by 1995. Most families in major cities own their own television sets, and they watch television frequently. In 1993, there were 115 television sets per 100 urban households and 69 sets per 100 rural households.

China Central Television (CCTV), the state network, broadcasts nationally; provincial capitals and other large cities have their own stations. CCTV, which was established in 1958, produces its own programs, a large portion of which are educational. The network manages the country's television programs and supplies 120 hours of programming per day to more than 90 television stations throughout the country. CCTV has eight channels, six of which transmit via satellite nationwide; one of the channels is beamed to more than 100 countries.

The Television University (TVU) in Beijing produces three educational programs weekly. The English-language lesson is a popular program. Other programs include daily news, entertainment, teleplays, and special programs.[63]

CCTV and TVU television programs reveal what the government considers acceptable

program content but do not reflect public opinion. Nonetheless, officially sanctioned programs do provide another window of information on China.

To a growing degree, foreign cable channels and satellite television are penetrating China. Cable television and satellite dishes allow for readily accessible programming from Hong Kong, Taiwan, and Japan. Foreign programs reveal what is popular among Chinese audiences. These programs include films, sitcoms, and cartoons that may--in the long term--influence Chinese public opinion or at least changing tastes in popular culture.

Cable television has become increasingly fashionable, and cable systems have proliferated. Domestic cable systems are found not only in large cities but also in county seats and among military units. Official sources reported that by 1995, there were 32 million cable television subscribers in China and estimated that there will be 100 million subscribers by 2000.[64] As of mid-1996, foreign cable companies still were denied direct entry into the China market since it is part of the services sector. Nonetheless, officials from various foreign companies are optimistic that the regulations will change by the end of the decade.

The government has tried to limit the susceptibility of the populace to the political and commercial intervention of foreign media. Personal satellite dishes, which began proliferating in the early 1990s, allow their owners to receive foreign-origin programs. The dishes are nominally illegal but continue to be used. In October 1993, Premier Li Peng announced a new law restating the ban on satellite dishes. Its major effect, however, seemed to have been to increase the cost of the dishes, since sellers had to take steps to conceal their stocks and to pay larger sums to the police to ignore them.

## Access Strategies

### Ground

"On the ground presence" is probably the best strategy for information access. "Ground strategy" refers to receiving information through direct orders and subscriptions to a variety of journals, or through personal contacts. It is more economical and efficient to capitalize directly on open source information than to go through intermediaries. Given the wide availability and variety of open sources, there is no reason to depend mainly on intermediaries.

Print media, Internet, radio, and television provide rich literature and timely information for access. Information can also be collected by contacting special organizations or by attending their conferences, where the information is not only fresh but also well analyzed. For example, the numerous Chinese students and professional organizations in the United States, include at least seven well established academic associations: Chinese Environment Society, Chinese Economists Society, Chinese Historians in the United States, Association of Chinese Political Studies, Chinese Association for Sciences and Technology, Chinese Academic Link, and Association of Chinese Professors of Social Sciences in the United States. These organizations hold annual conferences and publish studies in their fields that are an important window for US China watchers.

There are various ways of implementing the "ground" strategy. Conventional means such as interviews and translations are still valuable. However, basic computer communication skills have become increasingly important. For instance, a researcher should know how to access a library's online Public Access Catalog (OPAC) and retrieve bibliographic information using a personal computer. Analysts can access the Beijing University library from Washington, for example.

**Intermediary**

"Stand-off via intermediaries" is a supplementary strategy. The "stand-off" strategy, involves contacting intermediaries before reaching information destinations. Researchers can, for example, hire a Chinese agency to collect certain economic data. Or, one can contact experts for unique information. Of all the available strategies, however, the "ground" strategy is perhaps the best approach. The intermediary method should be used only when gathering rare and non-open source information.

**Mix**

A mix of "ground" and "stand-off" strategies is generally necessary. In most cases, the "ground strategy" should be applied when the general availability of information makes this strategy economically efficient. But for specific information, researchers should resort to a

"stand-off strategy" as early as possible, especially if they anticipate problems obtaining information. In this situation, the use of an intermediary can save both time and money.

### Prospects and Impact

The strategies proposed above should well serve the US government's open source collection efforts through 2010 and probably beyond. The general increase of open source materials and improved access to such materials suggests that the "ground" strategy is the most reasonable primary means of obtaining information from--and about--China. This method, however, requires improved Chinese and major minority language skills on the part of researchers, as much of the increasingly available material is in Chinese and other languages. The combination of more analysts proficient in Chinese language and greater access to information will enhance both the collection and analytical efforts of the US government. If the ability to access information destinations directly is compromised or information is unavailable in open sources, intermediary methods will have to be applied.

## Information Costs

### Increase

The costs of obtaining material on China are increasing. There are several reasons for an increase in information costs. When a new information technology emerges, the cost is high because investors and companies need to cover at least their basic costs. The cost will also rise because of the need to purchase books and other materials, including new computers and software. In recent years, the price of Chinese books has increased; that also will add to the cost. In addition, information costs respond to economic trends. High inflation leads to high information costs. In this case, the exchange rate between US dollars and Chinese Renminbi is a relevant variable.

### Decrease

Information costs fall if the above indicators go in a different direction. For example, as a piece of information technology becomes more widely used, the cost becomes less and lower

inflation favors stronger purchasing power. In order to lower costs, researchers should depend more on the "ground" than on the "stand-off" strategy, as explained in the previous section.

## Specialized Data

### Availability and Current Restrictions

There is a great deal of information available on China, even on specialized subjects such as subversive literature, defense planning data, defense conversion, crime and corruption, criticisms of state economic plans, criticisms of relations with foreign countries, and central-local relations. In this regard, two publications, one official and the other unofficial, are strongly recommended.

The official data set is *Zhongguo tongji nianjian* (Statistical Yearbook of China), published by the State Statistical Bureau in Beijing. This bilingual (Chinese and English) yearbook series covers the most important statistical categories in areas such as natural resources, population, employment, investment, energy, finance, price indices, livelihood, cities, agriculture, industry, construction, transportation, postal and telecommunications services, domestic trade, foreign economic activities, banking and insurance, education, sports, public health, and social welfare.

The unofficial volume is *Zhonggong nianjian* (Yearbook on Chinese Communism), published in Taiwan. This volume provides both data and analyses on important information absent from Beijing's yearbook. Such information includes Beijing's Taiwan policy, defense modernization, foreign policy, corruption, and personnel changes. Taiwan's yearbook is available only in Chinese.

The information in the two yearbooks covers almost every important development in China. The value of these yearbooks is their comprehensiveness and consistency.

Restrictions on specialized data are predictable. For example, the details of China's defense budget are not published. The information on this subject provided in Taiwan's yearbook and in other Chinese and non-Chinese publications leads only to confusion and uncertainty. China published a report similar to a Defense white paper for the first time in November 1995. The paper, entitled "China: Arms Control and Disarmament," covers totals of defense expenditures but

lacks detailed information and convincing analysis. China has also prohibited overseas subscription of *Jiefangjun bao* although anyone can purchase this newspaper within China. The monthly pictorial, *Jiefangjun huabao* (Liberation Army Pictorial), was once restricted, but now is available to foreign subscribers.

## Open Source Processing

### Translation

Starting in September 1996, China's Ministry of Foreign Affairs will no longer offer English-language press briefings. Foreign reporters are expected to learn Chinese.[65] This is just one signal that translations will continue to be an important source for China watchers in the United States. Translations provided by the Foreign Broadcast Information Service (FBIS) and those put out by commercial presses, such as M.E. Sharpe, are extremely useful. These services should be maintained at the existing level. However, as the flow of native Chinese information increases, more translations will be needed if US government analysts are to process all the information necessary to accomplish research tasks. There are more Chinese-speaking (and reading) individuals in the United States today than ever before. Many are highly competent, well-trained scholars now involved in academic, government business, or freelance research. The US government needs to better employ this rich talent in the future.

### Analysis

It is imperative to analyze gathered information, including translations. Comparing different sources and opinions is a first step. To master the changing situation in China, for example, US analysts should compare English-language news reports with translated Chinese sources. Solid analysis must be based on broad literature review.

Historical analysis is also necessary for a sound analysis of Chinese affairs because of the complexity and depth of current affairs in China. A historical perspective also assists analysts to filter out superficial or oversimplified information. Historical trends are more important than isolated news-grabbing events. American historians of China usually have a deep understanding of Chinese history and can provide the government with the necessary historical perspective.

Without taking a comparative and historical approach to the study of China, analysts will not be able to manage the complicated research job that faces them.

### Capabilities Needed

Some pundits have predicted that China will disintegrate politically by the end of this century or early next century. On the contrary, evidence about China suggests another fifteen years of steady growth. In light of this assessment, at least three research capabilities need to be strengthened.

The first is language. The Chinese language capability of the United States government, although at a higher level than at any previous time, is seriously disproportional to the rapid growth of China as a world power. Chinese-language learning and training should be a priority for the United States in the coming decades. (Registrations for Chinese-language study in 2,700 two- and four-year colleges and universities increased 36 percent from 1990 to 1995.)[66] Programs funded by the National Defense Education Act and similar programs are essential to the next generation of analysts. An enhanced language capability will bring about greater use of information coming directly from indigenous Chinese literature, a valuable source of information.

The second capability needing strengthening is general knowledge about China, including history, culture, politics, and economics. Some studies on China are superficial and misleading, partly because of an author's lack of a broad education in the field. Other studies are highly detailed, but their analyses are not placed in a broad historical context.

The third capability is knowledge of technology. The early part of the twenty-first century will be a different world, and the computing medium will bring about a situation where commerce and technology merge into a symbiotic whole.[67] Social scientists need to know how to access information in the new world.

## THE INTERNET

According to a Chinese source:

> The Internet in China still lacks sophistication. Although more and more information centers under State departments are linking their database to the Internet, most worldwide Internet users want more basic information from China.[68]

The Internet can be viewed as a combined communication and information utility--one that is beyond the financial reach of the ordinary Chinese citizen. This situation might change considerably if the utility were completely subsidized by the government or if world industry subsidized Internet as a free utility through massive online advertising. Of course, the sensitive issues of government control and cultural values would then become exacerbated, making government resistance to more widespread access to the Internet likely.

Internet was introduced to China in 1987 by the Chinese Academy of Sciences' (CAS) Institute of High-Energy Physics (IHEP). At the time, Internet access was accomplished through a low-speed dedicated line. The institute officially connected with Internet in 1993--initially to key research centers, businesses, the CAS, and technical universities. International connectivity was achieved in 1994 when the CAS Network Center (CASNET) and the IHEP established links with Internet nodes. Public access was introduced in 1995 by the United States Sprint corporation.

The information highway is taking hold and making rapid advances in China. Although external links remain limited in terms of number and capability, internal networks--intranets--continue to expand; both networks are hindered by technology and funding constraints. As of mid-1996, there were more than 190 networks registered with the country code CN (China). Nineteen of these networks are self-defined Internet service providers.[69] In 1996 China had seven dedicated lines for Internet connectivity.

It is clear that the Internet is becoming an indispensable tool at higher education institutions; the majority of users are from academic and research institutions although dissidents and overseas Chinese also are heavy Internet users. Internet allows scientists and engineers to correspond by E-mail and to make publications and software available anywhere in the world. Academic networks at institutions of higher education are the centerpiece of current Internet activity in China. The influence of the Internet is likely to be very small on education below the university level, however. In addition, it is unlikely that the Internet will have impact outside government, university, and commercial sectors in the near future.

Government organizations such as the State Statistical Bureau, the State Information Center (as well as local information bureaus), China International Travel Service, Xinhua, and

stock exchanges in Shenzhen and Shanghai are preparing databases both for free and commercial access over the Internet. Demand for Internet services is outpacing capacity. Although the MPT controls the only international gateway, the market for information services continues to expand. Licensing of Internet service providers is one means of checking unsanctioned growth.

As of late October 1996, Beijing continues to take a cautious and dual approach to the electronic information highway. Growth of the Internet infrastructure is encouraged and access is expanding. Simultaneously, however, use is subject to limitations. For example, in August 1996, the government approved opening Internet service to the public, recruiting Chinese users, and building more networks. The Beijing Telegraph Office was authorized by the Beijing Municipal Telecommunications Administration to develop ChinaNet service (see ChinaNet, below). Service is usually available to customers two days after applications are accepted.[70] Approximately 50 percent of Beijing's 6,000 ChinaNet users are private citizens; the remainder are Chinese enterprises and science and technology research institutions, foreign diplomats, or foreign-funded companies.

In early October 1996, Reuters reported that Beijing Municipality launched a campaign to promote understanding and use of the Internet. Advertisements in various media, such as newspapers and television programs--as well as in shopping centers--and large "Internet" signs displayed at post offices, are evidence of this new direction. There also has been increased competition between Internet service providers.[71] These moves can be viewed as the government's way of accepting the inevitable spread and increased use of the electronic highway.

Intranets, on the other hand, also are being promoted. Intranets allow the government greater control of the information highway as they are able to restrict access **into** the systems. One means of encouraging intranet use is its inexpensive fee structure compared to the more costly Internet. Another example of government support for intranets is the fact that while Guangdong Province was denied approval to build an international link to the Internet through Guangzhou, work on GNET, the provincial intranet, continues.[72] (GNET, a multimedia visual information network of Guangdong Province's Posts and Telecommunications Bureau, was established in 1995. GNET has county-level nodes in Dongguan, Foshan, Guangzhou, Nanhai, Shantou, Shenzhen, Zhongshan, and Zhuhai. GNET will extend to 23 (telephone) networks

within the province by the end of 1996.)

The denial of Guangdong's link to the Internet has been viewed by some analysts as an attempt to obstruct cross-border information access to Hong Kong. Further, there is also an information-infrastructure rivalry between the Shenzhen Special Economic Zone and the rest of Guangdong. As illegal cross-border Internet traffic has been noted between Hong Kong and Shenzhen, the refusal to extend the Internet is likely an attempt to inhibit such free information exchange.

GNET is not directly linked to the Internet although its hardware and software use Internet protocols. GNET primarily provides Chinese-language news and educational material. Its users are predominately businesses, but the number of individual users is increasing. As an intranet, GNET is much less costly than ChinaNet. GNET users do not need to register with the public security bureau unless they request Internet access.[73]

Overall, since late 1995, government measures have attempted to limit and control access to the Internet (see Control Mechanisms: Restrictions and Access, below). Of CERNET, and CASNET, and ChinaNet, only the latter is open to the general public. Further, these computer gateways commonly have software capable of determining the source and destination of information, a feature that allows the government to review information. The required registration for Internet users also allows the government to know who is using the Internet. Computer analysts note, however, that although China's regulations can prevent access to certain information and sites, there are various ways of circumventing the blocks.

Despite the government's policy of limiting and controlling Internet access, in actuality, Internet access appears to be increasing. In May 1996, China Internet Corporation Limited (CICNET, a Hong Kong-based organization of China's official Xinhua News Agency), and GNET "officially linked up" to promote information exchange. (CICNET provides subscribers with diversified commercial information services through the Internet.) In October 1996, it was reported that CICNET has established an online service for businesses. The service, "a highly secure, highly reliable intranet," will supply approved news items from Xinhua and will block subscribers from numerous World Wide Web sites, for example, those operated by US news agencies and human rights groups.[74] This service is another example of the government's dual

approach to the information highway--an attempt to restrict access to sites that provide information considered controversial and potentially subversive-- and the use of new channels to garner revenue.

In July 1996, Gansu Province opened its "node of the State's scientific and technological information network of the Internet." The Gansu node is Internet's key link to northwest China. E-mail, document transfer, and remote registration are available.[75]

In addition, domestic press reports note that Internet is a part of daily life and an increasingly popular source of information among Chinese intellectuals.[76] Sales of personal computers continue to rise--so much so that sales in 1995 of 1.1 million units totaled the combined 1993 and 1994 volume. As the number of families buying personal computers for use at home increases, Internet usage will likely expand beyond intellectual exchange.

China has three categories of online service providers: the national and regional public Internet offerings of the MPT; private-use ministerial online services; and competitive Internet operators. The latter sector is market oriented and serves business and residential users on a for-profit basis. The private-use ministerial online services, however, have the most subscribers.[77] Competition between the MPT and non-MPT providers has resulted in lowered prices.

## Networks

### ChinaNet

In November 1995, China's MPT, Zhongxun Communications Development Ltd. (directly supervised by the China Posts and Telecommunications Industry Corporation), and AsiaInfo Computer Network Inc. signed an agreement to build ChinaNet (or Chinanet), China's branch of the Internet.[78] The commercial data transmission service of the MPT, ChinaNet is connected with ChinaPac and ChinaDDN and is managed by the MPT's Data Communications Bureau, a part of the Directorate General of Telecommunications. China DDN and ChinaPac both transfer data and serve as platforms for Internet services (see Telecommunications Networks). ChinaNet seeks to become one of the world's largest Internet systems.

ChinaNet has links to metropolitan area networks domestically and to Internet internationally, extending to all provincial-level units and serving an unspecified number of

subscribers in more than 200 cities. International links are from Beijing and Shanghai, its first two nodes. As of mid-1996, ChinaNet had 31 backbone nodes covering 30 provincial-level administrative units and eight management centers; connectivity to all provincial-level capitals is expected by the end of 1996. ChinaNet will ultimately provide Internet access to approximately 360,000 state enterprises and 8.6 million private enterprises in 600 Chinese cities and link them to the major international networks.

In July 1996, it was reported that Jinan, the capital of Shandong Province, had invested more than US$24.1 million to establish a citywide node on ChinaNet. Jinan is the first city to connect to ChinaNet since Beijing and Shanghai connected in 1995.[79] The network has 1,500 subscriber terminals.

ChinaNet also has connectivity to the major academic and research institutions and the National Library of China in Beijing and to sites providing information on tourism in major cities and foreign-funded enterprises and their service networks. ChinaNet services are available two days after an application is accepted.

Subscribers can access a wide variety of information from domestic publications, such as *Renmin ribao* and *Market*, to foreign publications, such as the *New York Times* and *Liberation* [Paris] (see Internet Publishing, below). Monthly subscription fees are US$12 for six hours of online usage and US$72 for 40 hours.[80]

**China Education and Research Network (CERNET)**

The China Education and Research Network (CERNET) was initiated and is managed by the State Education Commission. It was established at Qinghua University in 1994 to link higher education institutions. CERNET has three levels: a national network, eight regional networks, and campus networks. CERNET information resources are categorized according to university information, information on technical/specialized topics (including water resources and a law database), information on international sports events, information for the general public (including tourism and recipes), libraries with HTML interface, electronic magazines, and mirror sites for many popular web sites in other parts of the world.

The first phase of CERNET was targeted for completion in December 1996; it was

finished one year ahead of schedule, linking more than 100 universities and other academic bodies to CERNET and Internet. By the end of 1996, all provincial-level capitals are scheduled to have access through nodes at Beijing and Shanghai. By 2000 it is planned that CERNET will connect all schools--from the primary level through universities--as well as other education and research entities. The effort to expand the use of computers and to attain local area networking of approximately 25 percent of 900,000 schools by 2002 (11 million personal computers) is being led by the State Education Commission. CERNET offers various types of online news, educational database searches, scientific and technological indices, and E-mail access.[81]

CERNET's Administration Board, composed of government officials, is responsible for policy. Documents on management regulations, network safety management, and users' regulations have been issued. A Technical Board plans, designs, implements, and updates CERNET.[82] CERNET relies on state and local funding as well as other sources.

**Other Information Networks**

The Shanghai Educational and Research Network (SHERNET) was inaugurated in January 1996 at Shanghai Jiaotong University. SHERNET links Fudan University, Shanghai Jiaotung University, six other institutions of higher learning, and two municipal education commission offices.[83]

There are other information networks. The Chinese Academy of Sciences Network Center (CASNET) operates the National Computation Facilities of China Network. With 12 regional branch academies, CASNET has connections to more than 100 research institutes. CASNET provides management information systems, multimedia systems, scientific database searches and E-mail.[84] The State Education Commission has a dedicated Internet connection to CASNET as do the Beijing University of Chemical Engineering and Jitong Corporation.

The State Information Center Value-Added Network (SICNET) opened an Internet access service in January 1996. SICNET has cooperative, exchange, and interactive channels between China's public enterprises and the world. The information centers of various provinces, municipalities, (nine) ministries, commissions, and bureaus provide coverage. "Unauthorized republishing is not permitted."[85] Beijing, Guangzhou, and Shanghai are already linked up; 400

additional cities are targeted. SICNET provides economic news--such as financial quotations and market information--and other online services as well as E-mail access.[86] The monthly subscription fee is US$360.

Beijing On-Line (http://www.bol.co.cn) is an Internet service with 600 web pages and more than 1,000 photographs. Beijing's largest Internet online information service, it provides information on science, technology, entertainment, books, and weather.[87]

Web sites are proliferating on a daily basis both in the academic and government sectors. For example, Beijing On-Line provides information on science, technology, entertainment, books, and weather. There are sites at Beijing, Nankai, Qinghua, and Tianjin universities. Government organizations such as the China State Information Center, the China S&T Information Center, and the CAS Institute of Zoology also have their own web sites, as do provinces such as Gansu and Jiangsu.

The expansion of the Internet has also led to the establishment of information-network training schools. The Internet Training Center is sponsored by the State Science and Technology Commission's Information Institute, IHEP, and the MPT.

## E-Mail

Use of "public electronic mail boxes," or E-mail, constitutes the greatest share of Internet traffic in China-- almost 75 percent of China's Internet users. E-mail messages are transmitted over internal networks established by some of the larger corporations, national ministries and organizations, and various institutes of science and research. These organizations are also linked to more than twenty overseas organizations. E-mail is also sent through the existing telecommunication network of Chinamail and the Golden Bridge E-mail System (GBES), which renders specialized electronic mailing services (see Improvements in Infrastructure and Technologies).

E-mail was first introduced in China by the Beijing Telegram Bureau and the Shanghai Long-Distance Telecommunication Bureau in October 1992. The following year, there were 700 E-mail users in China. It is expected that there will be more than 100,000 users at the end of 1996, and Xinhua has predicted more than 1 million Internet users by 2000.

The China Academic Network (CANET), a subscriber E-mail network co-founded in 1986 by the Beijing Institute for Computer Applications and the University of Karlsruhe in Germany, was registered in 1990. CANET seeks to integrate China's academic communities with the worldwide computer network and promote information exchange and technical cooperation--initially via E-mail.

Golden Bridge E-mail System (GBES) supplies specialized electronic mailing services to a wide range of users and is part of the National Communication Network of Public Economic Information. Beijing Email Co., Ltd. was established in March 1993 as a joint effort of the GBES and several related organizations. The company specializes in developing and operating GBES. Beijing Email is building an electronic mailing service network--that is, the Golden Bridge Project--for promoting broader use of E-mail in China (see Improvements in Infrastructure and Technologies).

## The Internet and Illiteracy

In 1978, the government's "Instructions on Eradicating Illiteracy" proposed a timetable for eradicating illiteracy. Between 1977 and 1990, approximately 49.2 million illiterates were taught to read and write, and during the 1990-92 period more than 10 million individuals became literate. The 1990 census revealed that out of a population of more than 1.13 billion, 180 million people still were illiterate. Of those illiterate, approximately 22.3 percent were age 15 or above, and 90 percent were from rural areas, of which 70 percent were women.[88]

The distribution of illiterates reflects disparities in geographic, economic, and social conditions. Rural, predominately geographically isolated areas with poor infrastructure have the most illiterates and are the slowest areas to show improvements in literacy. These areas are also the least likely sites for Internet activity as they have small communication markets and require large investments in infrastructure, which would have little offsetting revenues compared to investments in areas with actively growing enterprises. Even with state subsidies, satellite links for rural networks in China may be too expensive to support, and wiring every village and township is financially prohibitive.

The likelihood of an illiterate person using the Internet to learn to read and write is slight.

There are less expensive and more effective ways to learn elementary reading and writing skills, such as via TVU-type services. In addition, there is also the very real problem of language-based differences and incompatibilities with the Latin alphabet-based Internet.

English is the dominant language of the Internet. This so-called "language imperialism" is an issue that will be only partially overcome with technology. As of mid-1996, a Chinese-speaking Internet user must learn the English language to take full advantage of the educational resources it provides. It seems unlikely that China's government would impose the additional burden of learning a foreign language for this purpose on illiterates.

## Control Mechanisms: Restrictions and Access

Although the Internet is relatively new to China, China is a pioneer in the regulatory field. Regulations beget more regulations. Laws restricting Internet access are targeted in particular at international computer links. In August 1995, the MPT announced that China would tightly control the flow of information into the country. Since December 1995, constraints in general have increased. A December 1995 joint decree of the party and State Council warned that lack of control over the Internet would lead to the introduction of pornography and other "harmful materials"--that is, political information.

A January 1996 *Jingji ribao* [Beijing] article provided the context for further limitations on Internet use. It noted that a US Army officer allegedly used Internet to break into a confidential military information system, erase important military information, and enter misinformation into the system. The officer's exploits serve as a warning: "One can destroy through Internet a country's military command system without firing a single shot."[89]

On January 23, 1996, State Council Order Number 195 promulgated the 17-article "PRC Interim Regulations Governing Management of Computer Information International Networks" (or PRC Computer Data Network Internet-Access Management Interim Regulations); the regulations were signed and became effective on February 1, 1996. The regulations discuss improving the management of China's computer information networks--which are noted as "infrastructure useful for the spread of information for China's economy"--and links with international networks to ensure the development of computer information exchanges. However,

the regulations are restrictive rather than constructive--providing for increased official control of access to the Internet, and allowing the government to better monitor the exchange of information. Under the regulations:

- the MPT will select the channels for China's international connections to computer information networks and manage general computer networks;
- the Ministry of Electronics Industry will supervise the networks of computer companies;
- the State Education Commission will oversee the computer links of higher education institutions; and
- the CAS will administer the computer networks concerned with scientific research.
- organizations applying for Internet nodes must be legally constituted, have proper equipment and technical staff; flawless safety and security control measures, and other unspecified conditions that comply with relevant laws, rules, and regulations.
- individuals and organizations involved in activities that threaten public order, state security and secrets, as well as those with obscene and pornographic materials are expressly banned.

Less than two weeks after the regulations were signed in February 1996, the Ministry of Public Security issued a circular, "Notification of Registration of Computer Information Systems Accessing the Internet," "urging" the approximately 40,000 Internet users of international networks to register at public security departments at the country and prefecture levels--for a fee of 400 yuan--within thirty days of being connected and to inform the same departments if they change their hook-ups or disconnect them. If these users do not comply, they face punishment according to the Regulations on Protection of Computer Information System Security.

In May 1996, the State Council issued "Provisional Regulations for the Management of International Networking with Computer Information Networks of the PRC." These regulations clarify rules in the domestic online service industries and markets so as to favor the development of domestic online industries for government, business, and educational Internet services (putting residential users of the Internet on hold); to channel international Internet sources through strictly regulated domestic access for connectivity; and to criminalize sending pornographic and obscene

materials through the Internet. The MPT has "urged" the data communications office(s) of several provinces to improve the management of ChinaNet and establish subscribers' files.[90]

In August 1996, China attempted to further tighten its control over the Internet by blocking access to as many as 100 sites on the World Wide Web. Major United States media sites such as the Cable News Network and *The Washington Post* as well as sites providing information on Taiwan and Hong Kong were banned. The Amnesty International home page also was blocked from access. These restrictions can already be bypassed; academic networks (CERNET and CASNET) are free from the blocks imposed on the commercial networks and persons using overseas access numbers are unlikely to be affected. Moreover, industry analysts believe increased traffic on the Internet will make blockage increasingly unfeasible.[91]

Another method of controlling Internet services is cost. User fees are high--particularly for a scholar (see ChinaNet). Moreover, Beijing is investigating the use of fee differentials based on statistical records of usage, for possible future implementation. This may be another means of restricting access. Further, financial resources are needed to obtain the equipment needed to access Internet. As a result of these monetary considerations, most Internet users are those who have access to computers at their places of work--which pay the user fees. An additional problem is the limited availability of computer time.

The question of controlling the Internet--that is, restricting the accessibility of and censoring types of information--continues to be a concern of China's leaders. In fact, the director of the CCP's Propaganda Department visited Singapore (a model of control over the press) in July 1996 to gather ideas on screening out unsuitable material. Singapore's controls seek to "...monitor activities in cyberspace that it believed could undermine its political and social stability"; the same motives would apply to China.[92]

Nonetheless, the proliferation of online service industries because of market demand has caused "a kind of chaos...." Despite government attempts at restrictions, there is a "lack of overall market regulations over almost all aspects of development: national planning, construction of new data communications infrastructure, technical standards, domestic interconnection and operation management."[93]

Additional regulations to ensure greater information security and stricter controls on

access and usage of the Internet will continue to be promulgated. For the short-term, the rules will inhibit private-use, ministerial, and competitive online service providers because they must obtain permission from the State Council to establish a new Internet network. The existing competitive online service networks not regulated by the MPT, Ministry of Electronics Industry, State Education Commission, and CAS will be examined closely in terms of market performance and service quality.[94]

Network security and information security are major topics in network design and daily operation. Firewalls and access lists have been established on different levels to improve network safety. In June 1996, China's first domestically developed Internet firewall products, Taliet 1.0 and 2.0, were certified. The products were a joint venture between the Beijing Institute of Electronic Technology Applications and Beijing Tianrong Xinjimao Ltd.[95] Regulations on firewalls have not yet been promulgated, but it is likely that they will be, and that they too will be problematic for enforcement. Technology changes faster than the government's ability to monitor traffic. And, if there is a financial gain to be made from postings on the Internet, it will occur and likely face competition. All these factors will lead to more availability of information.

In another example of increased access, the National Library of China and IBM will cooperate in putting the library's books on the Internet. The *Illustrated 500 Arhats*, a four-volume manuscript of illustrated Buddhist scriptures drawn in the early twentieth century, will be digitized. The wealth of information that is the National Library will then be available through the Internet.[96]

## Impact on Internal and External Communications

The Internet is providing increasing amounts of information on twentieth-century China, in English as well as in Chinese. The nature of that availability is, however, uneven. Servers go off-line, home pages move, some information is free while other information is not.

A large number of professionals from China in both the hard and social scientists have been trained in English-speaking countries. Many of those in the scientific and engineering elite of China's academic institutions and organizations thus have the benefit of English as a second language and hence can easily use the Internet as a tool for obtaining a wide variety of open

source materials.

One very important source of technical information is the large number of journals published by the Institute of Electrical and Electronics Engineers (IEEE) that will soon be online to subscribers. IEEE journals are recognized internationally for their high quality. In general, as more scientific and technical publications become accessible on the Internet to their electronic subscribers, they will become the primary avenue of open source information. There are thousands of scientific papers, technical reports, economic reports, and electronic preprint (eprints) available on the Internet. Most are in English, although a growing number of papers and technical reports are also available in German and French.

Thus, for China, the use of Internet is fraught both with advantages and disadvantages. The catalogs of thousands of libraries, including the Library of Congress, can be accessed online with any Internet browser. The large number of technical and scientific articles available in postscript and other formats is enormous. Moreover, these articles are free of charge and available for copying and distribution. Websites in China can add value by providing basic domestic data, such as information on tourism and investment opportunities, in hopes of gaining revenue. For example, the Fujian Fair for International Investment and Trade, an annual event since 1987, and scheduled for September 8-12, 1996, will be posted on the Internet. Participants from provinces, ministries, and commissions as well as outside investors attend the fair. Nonetheless, websites can also be potentially threatening--as a means of accessing information--or putting out information that the government views as subversive.

The Internet is also a valuable tool for improved internal communications. An August 14, 1996 *China Daily* [Beijing] article chronicled using Internet's search capability for student enrollment purposes. Two administrators from the Beijing People's University of China used Internet (via Windows and Netscape) to access a computer system in the Guangxi Zhuang Autonomous Region's Enrollment Office to download information on--and then select for admission--from among the most-qualified applicants majoring in science.[97] This remote access allowed the administrators to accomplish in hours what previously had taken days--both in terms of travel time and manual selection.

## Scenarios for Control

Although there are political, social, and economic news databases about China available free of charge on the Internet, many of the same databases also are structured for fee-paying customers. There are more restrictions on the receipt of information for free users. One such limitation is on the date range both for access and search capabilities.

The two initial regulations targeted at controlling the Internet were issued in 1995 in quick succession, separated by only a two-week interval (see Control Mechanisms: Restrictions and Access). This fact may be indicative of two things: first, that the "big picture" of restrictions targeted at the information explosion may not have been fully understood, and second, that enforcing such restrictions and controlling the information environment is very difficult.

In early September 1996, the power of the Internet became evident when calls were posted on electronic bulletin boards for student demonstrations two weeks hence to protest Japanese actions on the Diaoyu (Senkaku) Islands. As a result these postings, Beijing witnessed massive demonstrations. Subsequently, government officials again moved to limit access to the Internet. Computer technicians were ordered to monitor the Qinghua University computer bulletin board and delete offending materials. The bulletin board at Beijing University was closed.[98]

It is likely that central oversight of the Internet will continue; what is unclear is to how great a degree enforcement will prevail. The unique trait of the Internet is that it nullifies geographical distance and time in a way that is impossible for standard broadcast media. The future of the Internet in China will depend upon whether or not Beijing accepts the Internet as a distributed medium for global publication and communication that is similar, but more far-reaching than print, movies, radio, or television. It is likely that use of and access to the Internet in China will continue to be available through 2010 to those who can afford it or to those who have access through academic or business connections. Intranets, however, will continue to be the government's preferred electronic medium as they allow greater opportunities for control.

## OPEN SOURCE INFORMATION: RESTRICTIONS OR LIBERALIZATION?

### Leading Information System Institutions

From an institutional perspective, China's mass media are part of the propaganda system, which includes the Ministry of Culture; the Ministry of Radio, Cinema, and Television; the State Press and Publication Administration; Xinhua News Agency; official central newspapers; and other organizations and publications. The entire system is under the jurisdiction of the CCP Propaganda Department.

The most important institution in the non-economic information system is the Ministry of Radio, Cinema, and Television. It disseminates both news and propaganda and serves as an administrative body for the nation's radio, motion picture, and television industry. The ministry has ten functional elements: Office Department; Chief Editorial Office; Film Industry Administrative Bureau; Social Management Department; Personnel Department; Planning and Finance Department; Science and Technology Department; Foreign Affairs Department; Security Department; and Education Department.

The Xinhua News Agency is the largest news agency in China and serves as the main provider of daily information, both domestic and overseas. It has a staff of 7,000 (4,000 in Beijing), including 300 reporters, editors, and translators. Xinhua has domestic bureaus in all provincial-level units, throughout the military, and in Hong Kong and Macau. Its 92 subbureaus cover the Asia-Pacific, Latin America, Africa, and Middle East.[99]

Thus far, Xinhua has no real competitors with the same power of news collection and distribution. Zhongguo Xinwen She is just another official agency that gives news briefings to foreign counterparts. But, if China institutes deeper political reforms within the next ten years, more competitors in this arena will emerge, which in turn will provide greater access to information.

### Advocacy of Restrictions

The structure of China's information system itself demonstrates its nature and status: it is centralized and has no autonomy. Assessment of China's policy of restrictions and liberalization must start from this point.

The state and the party control the media, the main source of information for China's citizenry. The primary official newspaper is *Renmin ribao*, which is under the direct control of the CCP Central Committee. The editor-in-chief is a party appointee who must be approved by the top leadership. Editors or reporters who violate basic party lines are removed immediately. *Renmin ribao* is an important source of information because it always carries the earliest official pronouncements on China's domestic and foreign policy. It also regulates the contents and style of other official newspapers.

Each CCP provincial-level committee publishes a newspaper. For example, Jiangsu has *Xinhua ribao* (New China Daily), Guangdong has *Nanfang ribao* (Southern Daily), Shandong has *Dazhong ribao* (Dazhong Daily). Major domestic and international news coverage in these newspapers resembles that of *Renmin ribao*. Other pages carry local news reports.

The more useful and accurate the news, the greater the government control. Traditionally, this is the case because of political sensitivities. There is a wide variety of internal media documents, including, in ascending order of secrecy and restriction, *Cankao xiaoxi* (Reference News), *Cankao ziliao* (Reference Information), *Neibu cankao* (Internal Reference), "red-head reference" (*hongtou cankao*), and *Shouchao wenjian* (Hand-Copied Documents). *Neibu Cankao*, for example, is restricted to cadres at the department or provincial levels, and to military officers at or above the division level. "Red-head reference" is so called because its headlines are in red. "Red" publications are restricted to CCP Central Committee members and certain other top-ranking provincial officials. These materials are restricted because their contents contain state secrets, politically subversive or sensitive information, or negative reports on the Chinese leadership.

The State Press and Publication Administration, a ministry-level agency established in early 1987, was created to tighten administrative supervision of the press. This organization has promulgated detailed regulations governing newspapers' registration, operation, and content. The regulations were adopted in December 1990 and publicized in early 1991. In addition to instituting specific bureaucratic requirements and procedures, the regulations have formally enshrined the preeminence of party control over the press. In the early 1990s, the government considerably increased its checks on journalists. As of November 15, 1990, all journalists were

required to obtain PPA press cards, for example.[100]

In mid-1991, in a move to exert further control, a special central "information office," which is under the State Council, was established to supervise propaganda aimed at foreign audiences. The creation of the office allowed for a more coordinated and specialized scrutiny of the assembly and dissemination of material for foreign audiences.[101]

As of 1996, official control of information has extended to business and economic sectors. At the policy level, in April 1996, Sun Jiazheng, minister of radio, cinema, and television, said that by 2010, China will have promulgated a radio and television law and a motion picture law that will provide a backbone for current regulations.[102] The law will establish an administrative and legal system to enforce regulations for the radio, film, and television industries.

In April 1996, China issued a seven-chapter, 25-article "Methods for the Exercise of Administration over Publication in China of Economic Information by Foreign News Agencies and Their Information Subsidiaries" to govern the release of economic information in China.[103] According to these regulations, the publication in China of economic information by foreign news agencies and their information subsidiaries, including joint venture companies and companies of sole proprietorship and their commissioned or agent companies, is subject to unified regulation by Xinhua News Agency. Publication in China of economic information by entities and their subsidiaries is subject to examination by and approval of Xinhua.[104] In this regard, Chinese authorities are viewed as motivated by economic benefit. The director of the State Press and Publication Administration, Yu Youxian, has also said that his department would tighten controls over China's diverse and excessive media and eliminate small newspapers.[105]

Also in April, China banned foreign media representatives from visiting orphanages, nursing homes, welfare centers, psychiatric hospitals, detoxification centers, forced-labor centers, prisons, and other institutions.[106] The assumption was that these facilities might yield sensitive information to prying foreign media. China will likely maintain this prohibition as long as foreign visits are perceived as hostile. However, China may take some small steps and effect subtle changes that would render it more open and receptive to talking about the human rights situation and slightly more tolerant vis-à-vis human rights and certain types of foreign visits by 2010.

In June 1996, the Ministry of Radio, Cinema, and Television issued a circular calling on all

radio, television, and cable television stations to strengthen their management of radio and television broadcasts so as to improve their overall quality. The circular also urged increased censorship over all broadcasts. Programs were ordered to be conducive to "reform, development, stability, and socialist spiritual civilization and suitable for China's national conditions." They also must benefit the psychological and physical health of juveniles.[107]

Last and perhaps most important, the Ministry of State Security stepped up intelligence surveillance on foreign nationals after a record number of state secrets were leaked in 1995. It was reported in March 1996 that 380 state secrets were obtained by foreign intelligence agents or businesses in 1995. Of these, 182 were classified as "top secret" or "secret." According to the report, the secrets were not leaked by Chinese sources but were the result of foreign espionage.[108] The ministry claimed that Japan and the United States were the most aggressive in collecting China's secrets; Taiwan was also noted for gathering Chinese economic and military information. China expelled at least four foreign diplomats in 1995 for allegedly spying on China's military installations. In highly publicized incidents, three US military officers and a Japanese colonel were expelled.[109]

China's leadership remains conservative despite its "opening" policy. As of mid-1996, the central government had tightened its control over political propaganda and education. The importance of politics has been highlighted several times by President Jiang. As a result, all aspects of society, including the information system, are subject to political influence. Unless the government institutes comprehensive political reform, this type of political profile will continue to be China's political legacy. At the present time, radical political campaigns or movements are nonexistent.

**Liberalization**

The premises and protocols of China's mass communication system work in several ways. Upon close scrutiny, observers discover that not only does China's news apparatus exhibit far more flexibility in reality than on paper, but there is also a tendency for liberalization to coexist with the restrictions--and to be sustained over time. This situation will afford greater opportunities for the US government through the 2010 period.

The media control system has never been as inviolable as the authorities might wish; even secret documents at the top level have been subject to leaks and transmitted to the public. Rigid concepts and practices in journalism have proved dysfunctional, and adaptability and flexibility have become essential to the maintenance of the system itself, especially since the beginning of the reform era in the late 1970s.[110]

At an institutional level, economic reform and sociopolitical experimentation have interacted synergistically; the expansion of China's media marketplace in terms of number of outlets and variety of programs has spurred journalistic competition and responsiveness to the public demand; and reduction of state subsidies and the rise of commercial financing have necessitated seeking means of greater economic independence, which in turn have laid the groundwork for more professional autonomy.[111] This trend of tying media expansion to the marketplace is unprecedented.

China's open policy since 1978 has brought in foreign investment and foreign correspondents and ideas. A new generation of journalists in China, who are in contrast to their docile and conforming predecessors, have begun to experiment with new perspectives and techniques.[112] Increasing numbers of scholarly journals and popular magazines carry independent and sometimes critical views, as well as fresh information. Cable networks are reaching more remote areas, although rural citizens still fall behind urban citizens in their access to diverse sources of information. A new nonofficial and popular source of information is the radio call-in talk show. Such programs provide fora for various voices and opinions from the public. All these "counter-traditional" efforts have enriched and liberalized China's daily life to an extent never previously experienced. This trend may further influence the open source information environment in the long term.

In addition, China has undertaken measures that will provide greater open source access and information over the next decade. The following are the planned or ongoing projects:

- Since the mid-1980s, China has begun to develop a Chinese-language computer system for personal computers. It has also introduced various kinds of Chinese sequence platforms. Many companies, including IBM, and Microsoft, have joined the effort.[113]

- The China Guoxin Information Corporation (CGIC), under the State Planning

Commission and the State Information Center, provides economic and market information to clients and publishes the weekly China Business Focus. The publication is distributed via Fax or E-mail.[114]

- The Posts and Telecommunications Administration of the Nei Mongol Autonomous Region has received US$10 million in loans from Finland and Israel to construct a new optical fiber cable project. Completion of the project will enable the region to offer digital telephone services for most communications activities and will lead to great improvements in transmission efficiency and a substantial increase in the capacity for telecommunications services.[115]

- In December 1994, UPS became the first express delivery company to link with the Shanghai Customs Electronic Digital Interchange (EDI) system. In April 1995, UPS was linked with a similar system operated by Beijing Customs.[116]

- On May 16, 1995, British Telecom announced the founding of a representative office in Beijing.[117]

- In June 1995, the China Foreign Transport Group (CFTG) and United Parcel Service (UPS) of the United States announced plans to establish a joint venture in order to meet the international parcel shipping needs of Chinese clients.

- In July 1995, the Beijing Telecommunications Administration and KDD of Japan opened a special fax network that integrates high-speed data lines with computer control and storage technologies.[118]

- In April 1996, US-based *Business Week* joined the State Council's Development Research Department in sponsoring the International Economic and Business Forum. During the forum, the magazine celebrated the tenth anniversary of its Chinese-language edition.[119] In May 1996, Guangdong-Nortel, a subsidiary of Northern Telecom Limited (Nortel), opened a new manufacturing facility, with an annual production capacity of 3 million telephones, in Shunde City, Guangdong Province.[120]

- Motorola of the United States launched a new digital mobile telephone service in 1996 in both Chinese and English to meet the demands of Chinese users, who rank third behind the United States and Japan. The new cellular mobile telephone services enable users to select either Chinese or English.[121]

- China Telecom counted 5 million mobile phone subscribers by the end of May 1996, just behind the leading company, AT&T. The number of China Telecom subscribers will reach 18 million by 2000, far ahead of any other company in the world.[122]

From a technical perspective, China may have taken these measures to improve the infrastructure. In reality, however, these information developments have offered China new avenues to the outside world and, in turn, have increased the availability of information about China.

## Leadership and Policy Shifts

China's leadership is currently composed of a group of political technocrats who hold political positions but have had scientific or technical training, and whose orientation typically can be both practical and conservative. Political observers also have described the leadership as a mix of "liberals" and "conservatives," that is economically liberal and politically conservative. Because central power is collectively shared by top leaders, many people have called China's leadership weak compared with previous strong individual leaders such as Mao Zedong and Deng Xiaoping.

President Jiang Zemin, who concurrently serves as secretary general of the CCP, is in the center of the political spectrum and probably best represents the overall nature of Chinese politics. Premier Li Peng, a Soviet-trained engineer, is commonly viewed as a hardliner in all aspects, economic and political. Chairman of the National People's Congress Standing Committee Qiao Shi, chairman of the National People's Political Consultive Conference Li Ruihuan, and minister of foreign affairs Qian Qichen are considered reformers and liberals. All of these men are members of China's top organ of authority, the CCP Political Bureau. Chinese leaders and scholars may not agree with this Western analysis of China's political picture, but the above description of the leadership presents one way of thinking about China's complicated internal political scene.

As a caveat, it must be noted that it is extremely difficult to predict which leaders will advocate information restriction or liberalization since thus far, the personnel reshuffle has not been delineated and is subject to constant reconfiguration and modification. As a result, the outcomes of various alternatives and what this portends for the US government is uncertain although it can be postulated that successors who advocate more open policies will opt for greater access to information while a more conservative leadership will seek to restrict and regulate the open source environment.

It is unclear in mid-1996, for example, exactly which major leaders will be elected by the

CCP's Fifteenth National Party Congress to be held in fall 1997. It is reasonable to believe that Jiang Zemin will be reelected as the general secretary, perhaps also being given the title of chairman of the CCP.[123] Mao Zedong created the title of chairman in 1935 and held it until he died in 1976. It is difficult to assess the genuine political meaning of this title change from general secretary to chairman, but it can be assumed that Jiang wants to boost his individual power with this old and honorific title. The return of the previous title of chairman would also suggest that China's leaders, such as Jiang, would likely emphasize a level of authority that former leaders Deng Xiaoping and Zhao Ziyang had tried to reduce and separate from state functions. Such a political "left" turn would have immediate impact on China's information system because Jiang would be likely to tighten at least his personal control of political information.

Jiang cannot be labelled as a conservative or advocate of restrictions on information simply because of his quest for the title change. However, when Deng Xiaoping encouraged rapid economic growth in 1992, Jiang was silent, an action that implied his disagreement. His personal leadership style has been inclined to centralized rather than decentralized authority. Yet, he also favors economic reform and modernization in general. It also has been reported that he prefers non-military actions toward Taiwan and the peaceful settlement of other international disputes. Jiang is definitely not a ultranationalist. He has often emphasized the significance of China-US relations, is receptive to Russian overtures, and has made frequent trips to Europe. He believes that the world is interdependent and that China should integrate into the world system. As for his lobbying for the party chairmanship, the purpose is perhaps aimed at finding a new way to consolidate his personal power against other political rivals.

Li Peng, who by law must step down as premier in 1997, is also a factor in the future of China's information system. If he gets the upper hand in the Fifteenth National Party Congress, which is unlikely, he would likely centralize all domestic economic and political powers, take rigid positions toward Western countries, and make it more difficult for information exchange between China and the outside. It can be expected that Li will continue to hold power in some capacity for some years and remain as a spokesman for hardline and conservative interests. But it is also possible that Li will be forced to retire and take a nominal position such as vice chairman of the CCP. In that case, a more "liberal" premier would support a reasonably open information system,

thereby enhancing access for US analysts and policymakers, at least in the short term.

Qiao Shi, Li Ruihuan, and Qian Qichen are considered more liberal-minded advocates of reform and opening to the outside world. Qiao has quietly pushed ahead legal reforms and strengthened the power of people's congresses at all levels. Some see him as the hope of China's democratization. But Qiao is also a competitor for power with Jiang and may lose his power after the Fifteenth National Party Congress. However, shared power between Jiang and Qiao would contribute to a more flexible political/information system.

Li Ruihuan, an outspoken statesman, has earned a reputation as a staunch supporter of economic and political reforms. He is one of the few top leaders who has suggested reversing the verdict on the June 1989 Tiananmen incident. But Li is also a strong nationalist, particularly on the Taiwan issue. He should be able to retain his power and may even be promoted to a higher position. A typical technocrat, Li would likely advocate a more advanced information system but also tighter political control.

Qian Qichen is an accomplished diplomat both at home and abroad. He suffered great humiliation in 1995 when the United States granted Taiwan president Lee Tenghui a visitor's visa only a few days after US Secretary of State Warren Christopher had told him that Lee would not be allowed in for such a visit. But it seems that China blamed the United States rather than Qian for this diplomatic failure and he survived severe internal criticism. Qian is likely to retain political power after 1997. As a liberal-minded internationalist, he is likely to make further contributions regarding access to information and US-China exchanges.

If Jiang Zemin and other yet-unidentified reformers make up the core leadership at the Fifteenth National Party Congress, it can be expected that China will have a more open information system. Some conservatives will continue to hold key leadership positions but will not be able to reverse the slow but steady process of the liberalization of information access. This situation will present the United States with continued opportunities to exploit a greater variety of open source information through the 2010 period.

## Next Generation of Leaders

### National Priorities

China's national priorities are clearly mapped out by the top leaders and published in various open-source materials such as newspapers, journals, or special documents. In 1973 China announced the four modernizations (industry, agriculture, defense, and technology and science) as its long-term national goal. These goals are still sought by today's central government. However, open sources have demonstrated that the government also has stressed other national priorities in addition to the four modernizations. *Beijing Review*, for example, published the full text of a speech by Jiang Zemin while he visited Germany, in which he outlined new major concerns of Chinese leaders.[124] Jiang stated that China must consider the relationship between reform, development, and stability. The government regards development as the objective, reform as the driving force, and stability as the precondition. Jiang highlighted the fact that China has switched from the highly centralized planned economy of the 1949-78 period and defined China's goal as building a socialist market. He also stressed common interests between China and the West.

Although one can learn about China's national priorities from open sources, it is necessary to exercise caution and to read between the lines. In the above case, Jiang spoke before a foreign audience and perhaps did not make all of his points as clearly as he would to a domestic audience. In September 1995, two months after his trip to Germany, Jiang spoke at the Fifth Plenary Session of the 14th CCP Central Committee. In this speech, he expounded on twelve relationships in China's development. His focus was still on the relationship between reform, development, and stability. But when talking about the market mechanism, Jiang also emphasized macro-control and called on the socialist market system to do a better and more efficient job than Western countries.[125] In short, if one exercises caution and compares information sources, open sources can provide useful information about China's national priorities, for example, the four modernizations, redefined so as to emphasize the relationship between reform, development, and stability.

Open sources can also provide information about the rationale behind China's holding such priorities and can signal future changes. Such information can often be found in scholarly works

that debate or propose China's development strategies. For example, Xiao Gongqin, a prominent "neo-authoritarian" ideologue in Shanghai, has boldly implied that nationalism should replace Marxism-Leninism as the ideology during China's transitional period. His Chinese-language article was translated by M. E. Sharpe in *Chinese Economic Studies*.[126] There has been no such official statement by Chinese leaders, but the younger Chinese generation in their thirties or forties tend not to hold a serious belief in Marxism-Leninism. New ideas such as that put forward by Xiao have been well received by top leaders and may become the mainstream ideology in the next 10 or 15 years.

Another example is the study written by two Chinese political economists, Wang Shaoguang (Ph.D. from Cornell and associate professor at Yale University) and Hu Angang (post-doctoral student at Yale and a researcher at the Chinese Academy of Sciences in Beijing). Their study, which is in Chinese, is entitled "Report on National Conditions"; it was published by Yale University in 1993. This report became available in translation in the English journal *Chinese Economic Studies*.[127] In their report, the authors call for an enlarged and stronger state capacity in China's modernization process. Echoing Xiao, the two authors urge a more authoritarian government for China. Wang and Hu argue that "the state (represented by the central government) is the primary leader in the development and growth of the economy, in political change and reform, in the transformation of society, and in the conduct of international relations." These examples of independent thinking from American-educated scholars were very well received by China's central government. The authors not only presented their report to a wide Chinese audience but also were warmly received by Chinese political elites, including some powerful offspring of top leaders. These people may become the backbone of the next generation of Chinese leadership. If this is the case, open sources have informed us of the interests and priorities of the next generation's leaders.

**Views of the United States**

An article published in *Zhongguo jizhe* (The Chinese Journalist) [Beijing] and translated in the FBIS *Daily Report: China* illustrates how open sources can explain the Chinese view of the United States.[128] This article, together with several books published in China, is representative of

recent changes in the Chinese perception of the United States. A summary of the article follows:

- The US media is seen as having an unconcealed bias against China. Attacks on the Chinese government, society, and culture come not only from the *New York Times* and the *Washington Post*, but also from some professors and researchers who couch their criticisms in an academic format.

- Human rights is an ideological matter. The whole of US culture is viewed as based on a Cold War mentality. The US Congress openly advocates the overthrow of the Chinese regime.

- As regards the "China threat," US academics, specialists, and the CIA are seen as concocting astronomical figures in terms of economic growth and military power and spreading them through the media in attempt to drive a wedge between China and neighboring countries.

- The United States is seen as favoring Taiwan's independence and United Nations membership.

- While the US press, Congress, and many intellectuals are seen as having an anti-China viewpoint, the US business community holds that China needs to be stable and that today's China does not pose a threat.

In the summer of 1996, China published two best-selling books: *Zhongguo keyi shuobu* (The China That Can Say No) and *Zhongmei jiaoliang* (Trials of Strength Between the United States and China). The former monograph was written by young intellectuals in China; the latter was written by researchers in the official China Institute for Contemporary International Relations. These two books reflect the same themes found in the article summarized above. Both books have attracted wide interest in and out of China.

*The China That Can Say No* criticizes the United States from social, cultural, economic and political perspectives. It argues that the United States has adopted a containment policy toward China and that in turn, China should take counter-containment measures. *Trials of Strength Between the United States and China* discusses Sino-US relations from the time of the Korean War (1950-53) to Taiwan's Lee Tenghui's visit to the United States. The authors warn that the United States is following a pro-Taiwan independence and containment of China policy.

In a poll conducted among Chinese youth in May 1996, the United States was ranked No. 1 among the most disliked foreign countries. On other questions, 90 percent believed that the

United States is a great country with a prosperous material life and strong overall national power; 80 percent believed that the United States is a country that emphasizes material value and respects professionalism; more than 50 percent believed that the United States is efficient in work but that government officials and police are corrupt; 60 percent believed that US society is full of competition and employees' positions are not stable; 90 percent believed that the United States has serious problems with drugs, the rich-poor gap, and sexual abuse; and 90 percent believed that the US government has a hegemonist and unfriendly policy toward China.[129]

Thus, open sources such as Chinese books and newspapers clearly describe the Chinese view of the United States. Both FBIS publications and other US English-language publications have also commented upon the aforementioned monographs. Their reporting is not only timely but also comprehensive.

However, caution must be exercised when reading the Chinese materials described above. It is commonly accepted that China's government propaganda needs to be screened carefully. Similarly, one should not accept public open sources without looking below the surface. The difference lies in the official and public view. Although China's government shares the feeling expressed by the books, articles, and the poll, the authors wrote the materials on their own initiative and do not actually represent the government. In addition, since the normalization of diplomatic relations between China and the United States in 1979, the Chinese public, for the first time, has expressed quite extreme anti-US views; the government however, has been circumspect in its comments. If one reads Chinese official statements consistently, it can be seen that China's leaders seldom have described the United States as a threat--an exception having been the period of the wargame crisis in the Taiwan Straits in early 1996. In short, the difference between public and official open sources must be recognized, and the changing nature of China's view of the United States also must be recognized.

**Views of the World**

There is ample available open source materials to study China's view of the world. From Jiang Zemin's July 1995 speech carried in *Beijing Review*, for example, the following components of the Chinese world outlook can be summarized:

- The current world is rife with contradictions and unpredictables. Ethnic feuds, territorial disputes, religious strife, scrambling for resources, and trade frictions have emerged to have a regional and global impact.

- The use of force or power politics cannot resolve international disputes, but will only widen or spread conflicts and hostilities. The only proper way is to seek a peaceful solution through negotiations.

- The world is moving toward multipolarity. No single major power can dominate world affairs or manipulate other countries. All countries, big or small, rich or poor, strong or weak, are equal members of the international community.

- The world is a congregation of countries having different social systems, cultural traditions, religious faiths, values, and stages of development. Differences and diversities make for the world's multiplicity, which in turn generates a drive for interchanges and common progress among countries.

- The world is characterized by ever-increasing contacts among countries. No country can remain aloof from the international community, or cut itself off from the overall progress of world science and technology, or refrain from international exchanges on the world market.[130]

If Jiang's government is considered the third generation of leadership after Mao and Deng, the current leaders have demonstrated unprecedented fresh thinking about the world. From a Western perspective, China's leaders are using some very familiar western concepts and terminologies, such as interdependence and world market. Differences in values and ideologies between East and West appear to be shrinking at a tremendous speed. China's awareness of its ties with the world's technological change and progress probably also raises the hope of more channels of exchanges between it and the world in the near future.

In July 1995, *Zhongguo qingnian bao* (Chinese Youth Daily) [Beijing] reported on a series of surveys on how Chinese youth view the world. The views of the youth are very similar to the views expressed by the leaders mentioned above.

**Other Elements**

During the research process, we have found other important information about China not addressed in the preceding discussion. First, open sources indicate a strong relationship between

economic interdependence and China's opening policy. With increasing foreign trade, a growing number of memberships in international organizations, and application of advanced technologies, China has become gradually integrated (*jiegui* in Chinese) into the world system.

Second, China reciprocates actions by other countries such as the United States. It is interesting to see that China's actions tend to correspond to the actions of other countries, whether they be friendly or hostile.

Third, as Chinese national power grows, China may be more open about its internal information. China has been ambiguous about sensitive issues partly because of its desire to conceal the country's weaknesses.

## The Future

In the 2010 to 2015 period, China will continue to exercise control and censorship of the information flow, but to a proportionately decreasing extent. Information is not seen purely as news or data, but also as part of culture and politics. Hence, just as China is trying to build a modern society with "socialist characteristics," the information system in China will by no means be without restrictions.

Will China succeed in handling the repercussions of the information era? Yes, if China's political system continues to function as it does. In the Chinese view, it is people not machines that make the information era. China's authorities will try to screen out what is not suitable for their needs and does not meet their criteria. China's policy might be realistic for the short term because of the current limited development of computer sciences and, to some extent, public support for such screening. The loss of some information is not quite as important to the Chinese as is the shortage of material goods. This is not to say, however, that China can control the information flow as it wishes. By 2010, computer knowledge and automation facilities will be much further developed. As a result, China will be vulnerable to the impossibility of selection--too much to select and too much to monitor. In the end, China will still be different from the West in terms of censorship and central administration, but, perhaps inevitably, will become more open and transparent than it is now.

## APPENDIX

*[Chinese-language websites require Tiandao or Twin Bridge software and many services are fee-based.]*

1. Links to China
2. China News Service
3. Internet Charges of China News Service
4. Economic Information & Agency (China Customs Statistics Information Service)
5. China Statistics Consulting Databases
6. State Information Center Databases
7. China Home Page (Institute of High Energy Physics (IHEP), Beijing)
8. IHEP-Internet Networking
9. Internet Link in Beijing, 1995
10. Chinese Media Information Full List
11. Internet Forum
12. China Window Homepage
13. What's New on China Window?
14. What's New in Shanghai
15. Look at Shanghai
16. E-mail in Shanghai
17. Beijing Window
18. Fujian Window
19. China Magazines on Internet
20. Selected China and China-Related Information Sources Available on the Internet
21. China Publications
22. Profiles of Selected Chinese Publications
23. Basic Statistics for Distribution and Circulation of Books by Regions, 1994
24. Books, Magazines, and Newspapers Published, 1994
25. Publishers and Distributors in China
26. Publishers and Distributors in Hong Kong
27. The Structure of ChinaPac
28. ChinaDDN Network
29. The CERNET Topology Map
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